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INDIA RUBBER WORLD

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Volume 90 | July 1, 1934 | Number 4

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Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Cable Address: ELBILL, New York. Subscription $3.00 per year postpaid in the United States; $4.10 per year postpaid to Canada; $3.50 per year postpaid to all other countries.

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LOWER and LOWER

So goes the sulfur content of rubber goods required to withstand unusual service and severe aging conditions.

Here are the materials that are most useful in making good "low-sulfur" stocks:

Secondary Vulcanizing Agents

VANDEX • TELLOY

Accelerators

CAPTAX • ALTAX • TUADS • ZIMATE

Antioxidants

The AGERITES—Resin, Powder, White, Gel

For up-to-date data on compounding with these materials, read the Vanderbilt News

R. T. VANDERBILT CO.
230 Park Avenue
New York, N. Y.

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 90 | **New York, July 1, 1934** | **Number 4**

Rubber Cements

Ingredients of Rubber Solutions[1]

RUBBER cement is ordinarily understood to be a solution of rubber, in gasoline, benzene, carbon tetrachloride, or other organic solvent with or without accessory ingredients. Within recent years, however, rubber latex and preparations made from it have come to be used for many of the same purposes as the above-mentioned cement and are sometimes called rubber cements. These products will be treated briefly in the present paper, but to avoid confusion they will be designated as latex cements, and the term rubber cement will be used to mean solutions of rubber in gasoline or other non-aqueous solvents.

Both rubber and latex cements are used as adhesives, but they are also employed extensively for other purposes such as for binding and sealing compounds, for applying rubber coatings to various materials, and for making products as gloves and toy balloons by dipping.

The essential ingredients of a rubber cement are rubber and solvent. To these may be added sulphur and accessory ingredients for vulcanization, antioxidants, pigments, and other materials as required for special purposes.

Crude Rubber

The rubber commonly used for cements is the ordinary raw, or crude rubber of commerce, which comes to the market chiefly in the form of crepe or ribbed smoked sheets. Number 1, thin latex crepe is used where a light-colored cement is desired—otherwise either crepe or smoked sheets may be employed. Some specifications for cements call for certain kinds of wild rubber, especially for Upriver fine Para rubber. There is, however, little evidence that such cements are superior for general use to cements made from the crepe or smoked sheets which are produced on plantations. A percentage of a tacky African rubber is sometimes used with other rubber to increase the tackiness of the resulting cement. Particular attention is directed to the fact that the rubber used for cements must be raw or, as it is called by the trade, crude rubber. Manufactured rubber articles such as inner tubes, gloves, rubber bands, and the like have been vulcanized and are insoluble in all rubber solvents. There is no practical means of making a satisfactory cement from vulcanized rubber.

Solvents

The common solvents used in making rubber cement are gasoline, benzol, and carbon tetrachloride. Gasoline is the standard solvent for rubber so far as American practice is concerned. It is employed in grades having different rates of evaporation, depending on the type of cement to be made. For cement to be used for adhesive purposes one authority recommends a grade boiling in the range 65° to 128° C. (149° to 262° F.). A grade boiling in the range 67° to 140° C. (152° to 284° F.) is recommended for cement that is to be spread on fabric. Gasolines of a lower initial boiling point than 65° C. are looked upon with disfavor for cement purposes because of lesser solubility of the rubber, larger losses by volatilization in making and handling the cement, and "blushing" of the cement when applied as the result of condensation of moisture. Gasolines containing high boiling or difficultly volatile fractions are objectionable because cements made from them dry slowly and may be mechanically weak on account of the presence of residual oils. Most motor gasolines are unsatisfactory in this regard for use as rubber solvents. Some high test and aviation gasolines may be used as rubber solvents with satisfactory results, but in general it will be found advantageous to employ a grade of gasoline designed for solvent purposes.

Benzol is generally regarded as being a better solvent for rubber than gasoline, in that it softens and dissolves rubber more readily than gasoline and gives a cement that is smoother and of more uniform consistency. Benzol is a definite chemical substance having a boiling point of 80° C. and constant physical properties. When

[1] Abridged from "Rubber Cements," Letter Circular LC 411, Apr. 30, 1934. United States Department of Commerce, Bureau of Standards, Washington, D.C.

used in a cement it has the advantage that it evaporates at a uniform and rapid rate, and that it leaves no oily residue to weaken the rubber film obtained from the cement. Impure benzols contain a higher boiling homolog, toluol, as the chief impurity. This decreases the rate of evaporation somewhat, but it is not possible to secure with benzol the same range of volatility that can be obtained with gasolines.

Carbon tetrachloride is similar to benzol as a solvent for rubber. It is a definite chemical substance and when pure has the boiling point, 76° C. The outstanding advantage of carbon tetrachloride over both benzol and gasoline is the fact that it is non-flammable.

Both benzol and carbon tetrachloride would be more widely used in industry than is now the case were it not for the fact that they are toxic when inhaled as vapor or brought into contact with the skin. The susceptibility to poisoning from these substances varies greatly with the individual, but neither should be used without adequate ventilation and reasonable care to avoid contact of solvent or cement with the skin.

Solvent Activator

A solvent activator is a substance which increases the fluidity of solutions of rubber. Although rubber and solvent can be blended in any desired proportion, such mixtures become too stiff for practical use as cements with relatively low percentages of rubber. A solvent activator will increase the amount of rubber that can be incorporated in a cement which is being made to a given consistency, or will increase the fluidity of a cement containing a given percentage of rubber.

At the present time the only solvent activator on the market of which we have a record is a preparation of unrevealed composition sold under the trade name Bondogen. It is designed for use in rubber gasoline cements.

Vulcanizing Agents

Rubber cements may be vulcanized either with sulphur, or with certain organic compounds containing sulphur, or with sulphur chloride. Any form of powdered sulphur is satisfactory for use in rubber cements. Flowers of sulphur and ground roll sulphur are the forms most commonly available. Sulphur is seldom used alone as a vulcanizing agent on account of the relatively long time and high temperature needed for vulcanization. Certain complex organic substances known as accelerators are commonly used to speed up the vulcanizing process. These will be discussed more fully in a subsequent section in which formulas are given.

Accelerators usually require the addition of zinc oxide to function properly. Zinc oxide for this purpose should be the dry powder, and not the linseed oil paste used in paints. The addition of stearic acid may also be advantageous. Certain complex organic compounds containing sulphur function both as accelerators and vulcanizing agents. These will be described in connection with particular formulas.

Sulphur chloride, more properly termed sulphur monochloride, is a yellow, ill-smelling, corrosive liquid capable of vulcanizing rubber quickly in the cold. As a vulcanizing agent for cements and thin layers of rubber it is commonly employed as a 2% solution in anhydrous carbon tetrachloride or carbon bisulphide.

Antioxidants

Antioxidants are substances added to rubber to minimize the rate of deterioration. It is often advantageous to incorporate them in cements that are to be used for work requiring a reasonable degree of permanence.

Non-Vulcanizing Cements

The simplest rubber cement consists of crude rubber in a solvent. The ease with which the rubber will dissolve and the quality of the resulting cement depend upon the amount of milling or "break-down" which the rubber receives prior to being placed in the solvent. If the rubber is not milled at all, it is very reluctant to go into solution, and the resulting cement is non-homogeneous and will contain a low percentage of rubber (although quite stiff). Rubber which is milled a great deal, particularly on cold rolls, will dissolve very readily. The cement which results, however, is poor from the standpoint of adhesive qualities. It has a consistency somewhat like molasses with very little "tack." The best cement is produced when the rubber is given a small amount of hot milling just sufficient so that a reasonable amount, say 10%, may be put in solution.

This solubility of rubber may be changed with a solvent activator. By the use of about 2% of Bondogen in gasoline, it is possible to make a cement containing 5% of rubber which has not been milled at all. However the most important use for the activator is not for dissolving unmilled rubber but (1) to facilitate putting milled rubber in solution, (2) to increase the amount of rubber which can be put into a solution of given consistency, and (3) to decrease the consistency of a cement of any given rubber content.

Small amounts of cement may be made by placing 8 to 10% of milled rubber in a solvent and allowing it to swell for several hours. Occasional shaking or stirring after that period will yield a uniform cement in 2 or 3 days. Mechanical stirring will hasten the process.

Non-vulcanizing cements are used where a very strong bond is unnecessary. They are not suitable for use where the parts may become hot, as the cement will soften.

Vulcanizing Cements

With a vulcanizing cement a permanent bond can be made between most rubber surfaces and between certain other surfaces. Two types are described: heat vulcanizing cements, and cold curing cements vulcanized with sulphur chloride.

Heat Vulcanizing Cements

The basic constituents of heat vulcanizing cements are rubber, sulphur, an accelerator, and usually an accelerator activator such as zinc oxide. The accelerator is used to increase the rate of vulcanization and avoid the necessity for prolonged heating. The time required for vulcanization is greatly affected by the amount of sulphur, the kind of accelerator used, and the temperature employed. To illustrate the wide range of vulcanizing conditions, a cement containing simply rubber and sulphur would vulcanize in about 2 hours at a temperature of 288° F. The addition of certain accelerators may reduce the required time to as little as one or 2 minutes. In general, however, when very active accelerators are used, it is more practicable to use a little longer time than this for vulcanizing at a lower temperature. Cements can be made which will vulcanize in 15 minutes or less in boiling water.

If a cement will vulcanize at a sufficiently low temperature, it is often referred to as self-vulcanizing. This is not an exact term, however, as the temperature has a great influence on the time of vulcanization, and a cement which will vulcanize in a few days in summer might not vulcanize at all at winter temperatures.

Heat vulcanizing cements are applied by spreading one or more coats of cement on the parts to be united, allow-

ing the solvent to evaporate, pressing the parts together, and holding them under pressure while being heated at the vulcanizing temperature. After the cement is vulcanized, it is not dissolved by the solvents which dissolve unvulcanized rubber and is little affected by moderate temperatures.

Cold Curing Cements Vulcanized with Sulphur Chloride

If sulphur mono-chloride is in contact with rubber, vulcanization takes place in a very short period of time. A common way of using sulphur chloride for cementing is to give the parts to be united one or more coats of a non-vulcanizing cement. After the solvent has evaporated, a solution of 2% of sulphur chloride in a solvent is applied, and the parts quickly put together and held under pressure for a few minutes. No heat is necessary.

A rapid vulcanizing cement may be also made by adding with care a very small percentage of sulphur chloride directly to a non-vulcanizing cement. The amount added determines the time required for vulcanization. An example of such a cement is as follows:

Dissolve 10 ounces of rubber in 100 fluid ounces of benzol. Add 5 fluid ounces of a 2% solution of sulphur chloride in benzol and immediately mix thoroughly.

This cement must be used soon after being mixed as it will "jell" or vulcanize and become worthless in about an hour.

In vulcanizing with sulphur chloride a more careful control of the procedure is necessary than with other types of cements.

Typical Formulas

Following are some typical formulas for rubber cements together with information on their vulcanizing characteristics.

CEMENT NO. 1. (VULCANIZING)

Ingredients	Parts by Weight
Rubber	100
Sulphur	4
Zinc oxide	5
Zinc stearate	1
Diphenylguanidine	1
Benzol (or other solvent)	1,000

A film of rubber deposited from this cement will vulcanize in 30 minutes at 288° F. Other accelerators may be substituted for diphenylguanidine such as diorthotolylguanidine or mercaptobenzothiazole.

Other materials are often added to cements as, for instance, stearic acid as an added activator, antioxidants to improve aging qualities, and mineral fillers for specific purposes.

CEMENT NO. 2. (SELF-VULCANIZING)

Ingredients	Parts by Weight A	B
Rubber	50	50
Sulphur	4	..
Zinc stearate	2	..
Antioxidant	1	..
Zimate	..	1
Captax	..	1
Benzol (or other solvent)	500	500

This cement is made in 2 parts (A and B) in order to prevent premature vulcanization. Before using, mix together equal parts of A and B. The mixture of A and B can ordinarily be kept for several days, but it tends to vulcanize or "jell" and become worthless if kept longer.

A film of rubber from this cement will vulcanize in boiling water in about 15 minutes. It will self-vulcanize in time at room temperature.

CEMENT NO. 3. (SELF-VULCANIZING)

Ingredients	Parts by Weight A	B
Rubber	50	50
Sulphur	4	..
Zinc oxide	2	..
Zinc stearate	1	..
Antioxidant	1	..
Accelerator 552	..	1.5
Benzol (or other solvent)	500	500

This cement is made in 2 parts and used the same as cement No. 2. Its vulcanizing characteristics are similar to cement No. 2.

CEMENT NO. 4. (SELF-VULCANIZING)

Ingredients	Parts by Weight A	B
Rubber	50	50
Zinc oxide	5	..
Tetrone A	..	2
Benzol (or other solvent)	500	500

With this cement active sulphur is contained in the accelerator and no additional sulphur is necessary. The cement is made in 2 parts which are used the same as cement No. 2. Its vulcanizing characteristics are similar to cements Nos. 2 and 3.

CEMENT NO. 5. (SELF-VULCANIZING)

Ingredients	Parts by Weight A	B
Rubber	50	50
Sulphur	5	..
Zinc stearate	2	..
Antioxidant	1	..
Captax	..	2
Tetrone	..	2
Benzol (or other solvent)	500	500

This cement contains an excess of sulphur and a combination of accelerators in order to produce very rapid vulcanization. It is made in 2 parts and used the same as cements Nos. 2, 3, and 4. A film of rubber from this cement will vulcanize in boiling water in about 7 minutes. It will self-vulcanize at room temperature.

Making Rubber Cements

The method of making a rubber cement consists of first making a rubber stock by mixing rubber with the various ingredients on a rubber mill or in an internal mixer. In the case of self-vulcanizing cements, such as those listed, the 2 parts should be mixed separately. After mixing, the rubber stocks are put in solution by first allowing them to swell in a solvent for several hours and then stirring or shaking until a uniform mixture is obtained.

It is possible to mix cements containing small amounts of fillers more or less satisfactorily by placing the fillers with the rubber directly in a solvent. Better dispersion is obtained, however, by mixing rubber compounds as described. After a cement is made, it should so far as possible be protected from light and also, of course, from exposure to the air. A cement which is exposed to light deteriorates quite rapidly and decreases greatly in consistency, due to oxidation of the rubber.

Latex Cements

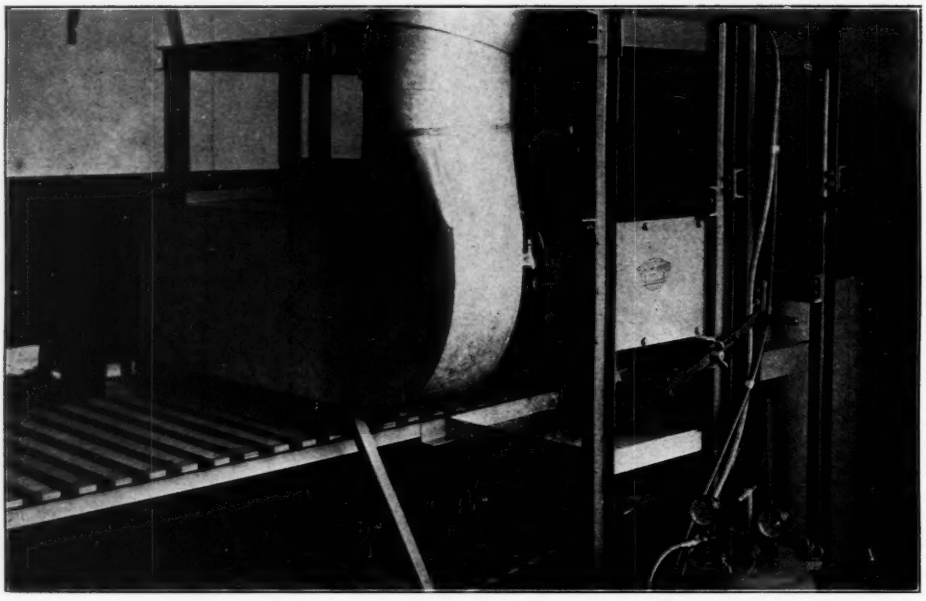
Rubber latex is the milk-like product obtained by tapping the rubber tree, and consists essentially of a dispersion of extremely small rubber particles in a watery medium. It usually has a higher rubber content than rubber cement but is much less viscous than the cement. As received in this country it contains about 3% by weight of concentrated aqueous ammonia as a preservative. Rubber latex finds many of its applications by reason of the fact that it has an aqueous medium and hence gives off no flammable or toxic fumes on drying. Artificial latex can be made from either crude or reclaimed rubber, and is used industrially to some extent. Rubber latex is a cement itself and may be used in the same manner as a non-vulcanizing cement by applying it and allowing the water to evaporate. It ordinarily contains 30 to 40% of rubber while the usual solvent cement contains about 10%, so that the amount of rubber left from solution will be proportionately greater for latex.

It is possible to make a vulcanizing cement from latex by adding sulphur and an accelerator. All added materials, however, must be soluble in water or properly

(*Continued on page 38*)

Spray Coating[1]

Automatic Spraying Mechanism for Rubber Products



Spray Coating Machine

SPRAY coating is a very effective and economical means of finishing articles with paint, lacquer, latex, cement, flock, and other sprayable materials. This method is now being applied in the manufacture of many rubber products. Its speed and versatility of application together with economy of material used are factors of outstanding interest in large-scale production. The successful special uses of this process in the rubber industry indicate its large possibilities in the future industrial applications of latex and other rubber dispersions.

For experimental and small-scale manufacturing in rubber work such as shoe lacquering the hand spray gun is suitable. For large production and coating large surfaces special mechanism has been devised such as the so-called "spray coater," as pictured. This machine is designed for automatically spraying any rubber product which requires a coating, the nature of which permits its passage on a conveyer passing under a moving spray gun.

The illustration shows the side of the machine from which the goods leave the apparatus after coating. The standard horizontal conveyer is shown, and the exhaust duct for carrying dust and fumes from the work. Beyond the duct a portion of the gun carriage projects. In the lower right corner is the pressure container for the spray material. The machine has a belt driven carriage, but a direct connected motor would ordinarily be used for this purpose.

The spray coater consists of a steel framework which supports a laterally moving carriage upon which is mounted a spray gun. The carriage, driven by a ½ h.p. motor, moves at high speed, horizontally or vertically over a suitable conveyer. The spray is cut off automatically within a fraction of an inch of each side of the work, and a positive hand control cuts it off instantaneously and completely at any point along the work.

The Spracoater applies a uniform coat of any desired thickness, limited in heaviness only by the physical qualities of the material used. It achieves a high degree of economy in material because of the cut off when the spray passes beyond the work, and the positive hand shut-off when gaps occur in the length of the work. Its rate of production is many times that of the hand-operated gun, being, at the standard adjustment of the machine, 45,000 square feet of single coat in 8 hours.

The spraying of rubber latex is one of many special coating problems which this machine has solved. It applies latex uniformly in any quantity per unit area of surface up to the limit of ability of the given latex solution to stand without flowing.

Another task successfully performed by this machine is spraying corrugated rubber matting with a thin coat of lacquer for the purpose of improving the appearance of the finished surface of the goods. The spray coat is applied to the corrugations uniformly and with an economy otherwise impossible.

In connection with the work of this machine it should be said that the objects to be sprayed need not have a continuous smooth or plane surface, but may have any form since the spray adapts itself to all irregularities of contour up to 2 to 3 inches in depth. The passage of the work through the machine does not need to be continuous because the control of the machine permits easy handling of irregular lengths.

[1] Data from Willard C. Beach Air Brush Co., Harrison, N. J.

Rubber Printing Rollers

Joseph Rossman, Ph.D.

THE following abstracts of United States patents conclude the interesting and informative article on rubber printing rollers begun in our June issue.

27. Muskett, 1,226,984, May 22, 1917. A rubber covered roller having a metal core with end collars and journals and rubber tubing wrapped spirally around it between the end collars is covered with a canvas wrapping and an outer rubber envelop, means for inflating the rubber tubing, and means for securing the canvas wrapping to each end collar.

28. O'Keefe, 1,256,361, Feb. 12, 1918. A press roller comprises a shaft composed of a central section and end journal-carrying sections telescopically connected with the central section, a sleeve fitted over the shaft, a rubber facing composition facing on the sleeve, and removable journals in the end sections.

29. Muskett, 1,277,995, Sept. 3, 1918. The invention is an improvement of patent No. 1,226,984. A metal mandrel is provided with a spiral winding of rubber tubing under fluid pressure. Around this tubing is a canvas wrapping, and an outer rubber sleeve is vulcanized upon the canvas wrapping, such rubber sleeve providing the periphery of the roller. The present invention relates particularly to the rubber tubing and also to means for securing the canvas wrapping at each end of the roller.

30. Linder, 1,317,713, Oct. 7, 1919. A vulcanized rubber roller has the cross-sectional surface larger at the middle than at the ends to compensate for the natural sag in the roller when suspended at its ends.

31. Goedike, 1,324,738, Dec. 9, 1919. A lithographing roller cover holder comprises a rubber body portion adapted to be applied to the end portion of the roller, yielding wire members carried by and projecting from the body portion, with which wire portions the end portions of the roller covers are adapted to engage, and means for drawing the outer portions of the yielding members toward each other to grip the end portions of the engaging covers.

32. Freedlander, 1,344,631, June 29, 1920. A soft rubber composition for ink distributing rollers comprising a vulcanized mixture follows: plantation rubber, 42%; ground pure-gum vulcanized rubber, 45%; mineral rubber, 3%; paraffin, 1%; litharge, 4%; lime, 1½%; sulphur, 3½%.

33. LaTour and Munnell, 1,345,200, June 29, 1920. An inking roller comprises a shaft and a sheet wound compactly upon it and subjected to a vulcanizing heat. The sheet consists of a part of the following ingredients, which include in weight, mixed aluminum flake, 2 pounds; baryta, 2 pounds; lime, ½ pound; sulphur, 3½ pounds; magnesia, 4 pounds; rubber, smoked sheet, fine, 34 pounds; rubber, smoked sheet, coarse, 6 pounds; and degras, 2 ounces.

34. Moon, 1,370,664, Mar. 8, 1921. An inking roller has a cylindrical rubber cover thereon and a fabric reenforcement embedded in the ends only of the cover and extending longitudinally to prevent elongation of the ends when the roller is in use.

35. Smith, 1,370,709, Mar. 8, 1921. A printing roller comprises a core of relatively hard rubber having peripheral flanges, and a soft rubber inking surface supported upon the core between the flanges.

36. Runge, 1,386,427, Aug. 2, 1921. An inking roller comprises a shaft, upon it a rubber cushion, and a coating of ink distributing composition entirely ensealing the latter.

37. Linder, 1,404,209, Jan. 24, 1922. A lithographing roller consists of a rigid core, a body of vulcanized oil, and a surface covering of vulcanized rubber with a grained surface.

38. Witzig, 1,414,449, May 2, 1922. The object of the invention is so to construct a rubber faced roller that the ends of the facing are efficiently anchored to the end of the core and, moreover, to provide such a roller wherein the ends of the facing will be protected against checking or tearing. The rubber blanket is secured at the ends of the roller by a special clamp.

39. Linder, 1,498,180, June 17, 1924. A printers' roller has a rigid core, a resilient rubber material, rigid washers secured to the core and cemented to the roller material to protect the ends of the material.

40. Smith, 1,528,956, Mar. 10, 1925. An ink roller is made by applying a substantially non-vulcanizing layer of rubber to a mandrel in the form of a cement, winding helically thereon a narrow strip of rubberized cord fabric, and vulcanizing a rubber cushion to the fabric.

41. Merrill, 1,529,033, Mar. 10, 1925. An inking roller results from vulcanizing a sheet of soft rubber sponge, winding it upon a support and securing it in spiral form to produce a generally cylindrical body, removing material from the body whereby a pitted, substantially cylindrical surface is provided, and applying a coating of gelatin to the surface.

42. Stevens, 1,555,389, Sept. 29, 1925. Rubber printing rollers are made by vulcanizing a soft rubber shell, spongy filler, and rubber sleeve to a spindle and permitting any expansion and gas caused through vulcanizing to find relief at the ends of the roll.

43. Davis, 1,576,726, Mar. 16, 1926. The method of forming a printing roller with a removable surface consists in providing the surface of the roller with a cementitious material of a nature to be softened under the action of heat or water, cementing to the roller by the material a plurality of spaced apart sleeves of a soft resilient rubber, and coating the sleeves with printers' roller composition.

44. Davis, 1,594,356, Aug. 3, 1926. The method of coating an inking roller for recoating or completing the roller consists in pouring over its surface, while in an inclined position, a molten coating composition in excess of the amount needed for the coating and allowing the surplus to drain endwise from the roller, leaving a film of composition thereon.

45. Freedlander, 1,608,206, Nov. 23, 1926. A printing roller consists of a soft rubber core composed of approximately 30% reclaimed rubber shoddy, 40% rubber, 24% white lead, 5% sulphur, and 1% lime, and a

relatively hard smooth covering thereon composed of approximately 75% rubber, 19% zinc oxide, 3% sulphur, 1% hexamethylenetetramine, and 2% candelilla wax.

46. Merrill, 1,659,371, Feb. 14, 1928. Making rubber rollers comprises semicuring soft sponge rubber sheet, wrapping it about a shaft to form a cushion element, covering the element with solid, soft rubber, and vulcanizing the composite structure.

47. Adsit, 1,668,258, May 1, 1928. A cylinder for printing presses comprises a cylindrical member, a plurality of curved plates secured around it with the margins of the plates separated from each other by dovetail gaps, cutting rules triangular in cross-section held in the dovetail gaps by the margins, and printing blanket material interposed in spaces between the rules having a rubber surfacing layer.

48. Linder, 1,669,942, May 15, 1928. A printers' roller consists of a rigid core, a covering of oil vulcanized to the core, a covering of rubber bonded to the vulcanized oil, and a surface coating of composition removable and replaceable without affecting the other 2 coatings.

49. Nissen, Jr., 1,695,437, Dec. 18, 1928. An inking roller for printing presses comprises a cylindrical solid body of resilient rubber, having integral outstanding peripheral walls of the rubber forming ink-holding pockets in its periphery that are elongated longitudinally of the axis of rotation of the roller and open through its periphery.

50. Gowans, 1,718,415, June 25, 1929. An ink transfer drum arranged for revolving and oscillating movement comprises a spindle; on this a sleeve movable longitudinally thereof; on the sleeve a rigid core having a spiral groove of substantially rectangular cross-section cut in the face thereof; and a hard rubber sleeve molded on the periphery of the core and in the groove.

51. Cattran, 1,785,673, Dec. 16, 1930. A printing roller is composed of rubber compound, the end faces of the roller being depressed to provide greater flexibility in the end portions.

52. Wolstenholme, 1,793,202, Feb. 17, 1931. A furnisher brush for textile printing comprises a rubber cylindrical base with elevations and depressions in its peripheral surface, each of the depressions having color receiving recesses extending beneath portions of the elevations adjacent to the depression.

53. Adsit, 1,804,139, May 5, 1931. A printing cylinder includes a cylindrical sheet portion and a film of rubber electroplated on the shell to form the printing surface of the cylinder to provide an offset means for receiving and transferring ink.

54. Elder, 1,870,773, Aug. 9, 1932. A composition roller with a rigid axis and a resilient cylindrical body formed around the axis consists of a mixture of 4 parts of rubber and one part cork and has the surface of the roller coated with a rubber solution.

55. Davis, 1,873,873, Aug. 23, 1932. A rubber roller is coated by providing a body portion tapered from end to end, applying a coating of molten printers' roller composition to the surface of the body, and permitting the material thus applied to drain in the direction of the taper, leaving a film of composition thereon of approximately uniform external diameter.

56. Fujii, 1,903,038, Mar. 28, 1933. An inking roller comprises a core, a felt layer wound around the stock, a layer of spongy rubber on the felt layer, and a tubular felt covering impregnated with a vulcanized rubber compound of rubber and felt.

57. Hampson, 1,908,237, May 9, 1933. A printing roller comprises a wooden roller, a removable attachment secured thereto and including a sleeve fitted over the wooden roller, a plurality of printing projections extending radially from the outer surface of the sleeve, the projections comprising a plurality of soft or semi-soft easily bendable and compressible rubber tits having recesses in their outer ends to form suction cups of less depth than the depth of the tits in which they are contained, and means for reenforcing the joint between these projections and the sleeve thereby to give rigidity to the base portion of the projections.

58. Keltie, 1,915,128, June 20, 1933. A furnisher brush for textile printing machines comprises a cylindrical core with a strip of material having uniform rows of elongated tapered radially compressible prongs constructed of vulcanized rubber projecting upwardly therefrom, having flattened heads helically wound around the periphery of the core and secured thereto to form substantially uniformly staggered rows of the prongs on the periphery of the brush.

59. Smith, 1,926,312, Sept. 12, 1933. A printing roller consists of a shaft, a core mounted thereon having its ends tapered, and an elastic rubber covering frictionally and removably held to the core, the end portions of the covering fitting snugly on the tapered ends of the core and terminating short of these ends to prevent casual longitudinal movement of the covering; the elasticity of the covering being the only means of securing the cover to the core.

Para-Graphs

PHOTOELECTRIC RELAY. An "electric eye" with new features as to compactness, speed, and economy, will handle counting and weighing operations with great accuracy. It is also well suited for controlling, signaling, and many other functions which require mechanical precision and dependability. It is capable of 450 operations a minute from light flashes of 1/15-second durations and not less than that between impulses.

ROLL TEMPERATURE REGULATION. The determination and regulation of the surface temperature of a calender roll is effected by apparatus consisting of an air sampling box conforming closely to one side of the middle roll of the calender. Air circulated through the box by a blower assumes the temperature of the roll surface. A thermosensitive bulb in the air outlet is connected by a capillary to a regulating instrument. As the temperature to which the bulb is exposed increases, the regulator operates a damper controlling the inlet of air, thus modifying the surface heat of the calender roll.

BANDAGE-PLASTER. Ditmaplast is neither a true bandage nor a plaster, but a combination of both. Made of creped rubber about 1.4 mm. thick, it is supplied in 5 sizes ranging from 4 by 85 cm. to 16 by 85 cm. It is claimed it will keep well at ordinary temperatures, is porous, and extensible in all directions.

PROTECTION FOR POLISHED SURFACES. Automobile parts, fenders, etc., are protected during storage and transport by a sheet of ordinary or crinkled paper secured to the surface by a non-tacky rubber deposit of latex. The aqueous dispersion may contain softeners such as a water dispersion of rosin oil, rosin, or pitch, and may be vulcanized or unvulcanized.

Tire Tests

Road Tests Show Behavior of Pneumatic Tires under Operating Conditions

Raymond Paustian [1]

AN INCREASE in tire rolling radius which accompanies an increase in speed, a maximum tire temperature for each driving speed, and loss of power due to underinflation of tires have been definitely determined in relation to economical automobile operation in a series of tests recently carried out by a western college.[2] The purpose of the investigation of which the foregoing tests were a part was the measurement of tractive resistance—the sum of all of the forces that resist motion of a motor vehicle. The flexing of pneumatic tires offers a definite resistance to motion as a car rolls along. It is natural, therefore, that the behavior of tires should be observed.

Fig. 1. Thermometer for Measuring Tire Temperatures

The equipment used consisted primarily of a Cadillac coach equipped with a gas-electric drive (motor-generator set). This type of equipment was chosen because it furnished a convenient and accurate method of measuring the amount of power required to drive the test car at a given speed. Such measurements were made under all operating conditions, in all kinds of weather, on a large number of road surfaces. The test car is replete with recording and indicating instruments that give an accurate record of the car's performance at all times. The 33 inch by 6.75 inch heavy-duty balloon tires with which the car is equipped are normally carried at 45 pounds per square inch pressure. The total weight of the vehicle is 6,300 pounds.

Changes in the rolling radius of the tires were first noted in connection with the laboratory calibration of the car, it being observed that the rolling radius apparently increased with the speed. The calibration tests were made on a chassis dynamometer having drums 48 inches in diameter. When the wheels of the car were centered on these drums and driven by the dynamometer, it was observed that the ratio between wheel revolutions and drum revolutions decreased from 1.44, at low speeds, to 1.41 at high speeds. This corresponds to an increase in the rolling radius of about ½-inch.

When the dynamometer was driven by the car and load applied by a prony brake attached to the end of the drum shaft, it was noted that, for a given speed, the ratio between wheel revolutions and drum revolution became greater as the load was increased. This indicates that a decrease in the rolling radius takes place as load is applied—an observation that is checked in the road tests made.

Practically all of the foregoing observations were checked by the results of a large number of road tests. In these tests, the number of revolutions of each wheel was counted as the car was driven at a given speed over a course of measured length. Wheel revolutions were recorded on the paper ribbon of a space-time recorder. As a result it has been observed that for a given speed increase, the increase in the rolling radius of the rear tires is less than in that of the front tires. This is due, probably, to the application of power at the rear wheels or to some form of slippage or creep. Values taken from tests on a level concrete pavement indicate an increase of 0.20-inch in the rolling radius of the front tires as compared to 0.17-inch for the rear tires when the car speed is increased from 0 to 50 miles per hour.

For a car ascending a grade, the tests show the rolling radius of the front tires to be greater than that of the rear tires. Values taken from tests on 0, 5, and 6% grades are given in Figure 2 and show how the rolling radius is affected by both speed and grades.

Temperatures within the tires of the car were measured with a thermometer set in a protective case within the tube of the tire; the stem of the thermometer projects through the rim of the wheel and temperature readings are taken by direct observations. See Figure 1.

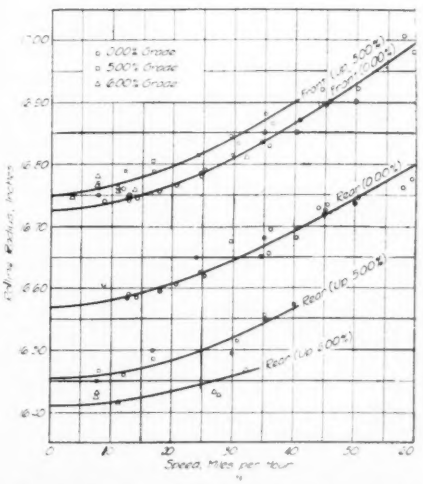


Fig. 2. Effect of Speed and Grade on Rolling Radius of Front and Rear Tires

The results of one of the tire temperature tests are shown in Fig-

[1] Junior Highway Engineer, Iowa State College, Ames, Iowa.
[2] Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa.

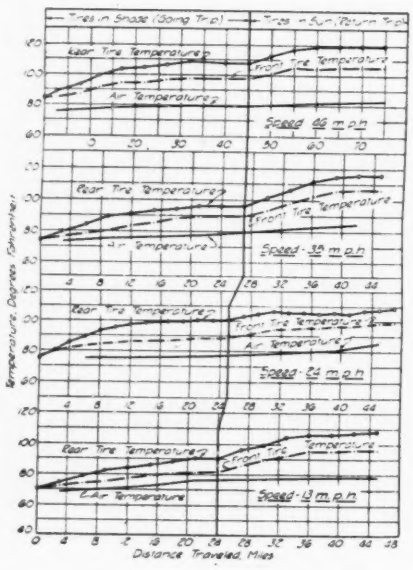


Fig. 3. Tire Temperature as Affected by Speed and Distance Traveled

ure 3. The data from which this curve is drawn were secured by running the car at a constant speed and taking temperature readings at various intervals. The temperature within the tire rose rapidly after the car had been driven a relatively short distance and continued to rise until a maximum for that speed was reached. Rear tire temperatures, it will be noted, were considerably higher than front tire temperatures.

All of the tire temperature tests were made on smooth concrete pavement; air and pavement temperatures were measured at the same time tire temperatures were read. A comparison of all 3—air, road, and tire temperatures—leads to the conclusion that there is a close relationship between tire temperature and air temperature. There is no positive indication that pavement temperature affects tire temperatures to an appreciable extent. The most reasonable conclusion that can be drawn from these tests is that the heat generated within a tire causes a temperature rise that continues until a maximum is reached. At this point, all additional heat is dissipated into the surrounding air as fast as it is generated and the resulting constant temperature is the maximum for the speed under the prevailing conditions.

From the foregoing series of tests, it has been possible to express the relationship between tire temperatures and air temperatures by the following equations:

Front tire temperature=air temperature + 8 + 0.22 speed (m.p.h.).

Rear tire temperature=air temperature + 18 + 0.33 speed (m.p.h.).

The difference between the temperatures of tires upon which the sun is and is not shining is also shown in Figure 3. In all of these tests, the tires whose temperatures were measured were shaded during the "going" trip and the "return" trip made with the tires in the sun.

Other climatic conditions, such as wind and rain, also affect tire temperatures in various ways. In general, winds tend to reduce the temperature of windward tires more than that of the other tires of the vehicle. Tests in rain indicate that a considerably lower temperature ensues when the tires become wet.

One of the more practical results of the investigation shows that tire inflation has considerable effect upon the amount of power required to drive the car and the gasoline used in generating this power. At any given speed, under-inflated tires offer more resistance to motion of a car than do properly inflated tires. This fact is clearly brought out in Figure 4, the data for which were collected in the laboratory calibration of the car. These tests were made on a chassis dynamometer, at various speeds and different tire inflations. There is obviously a greater power loss for a drop of 15 pounds in pressure than for an increase of the same amount.

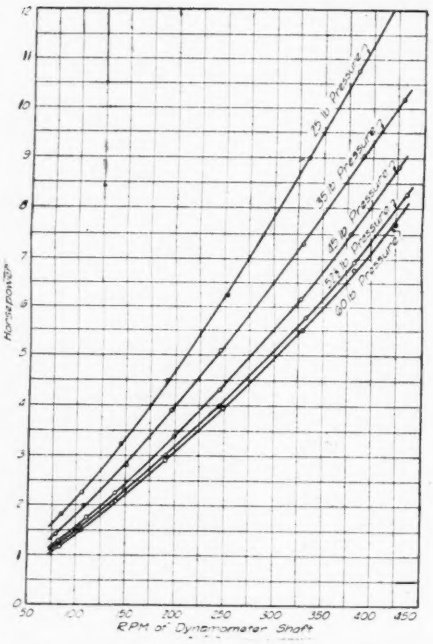


Fig. 4. Effect of Tire Inflation on Power Requirements

The foregoing laboratory tests were checked by a series of road tests, the results of which are shown in Figure 5. All of these tests were made at a speed of approximately 40 miles per hour on smooth concrete pavement. Tire inflation was varied from 20 to 60 pounds per square inch and records of gasoline consumption and power requirements secured. The results of these tests show the poor economy of driving with tires that are not properly inflated.

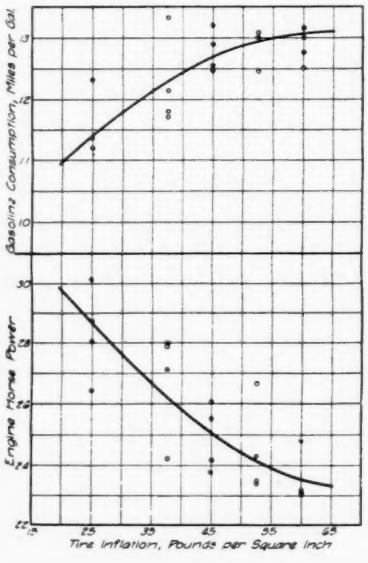


Fig. 5. Effect of Tire Inflation on Gasoline Consumption and Power Requirements at 40 M.P.H.

Crumb Rubber

CRUMB-LIKE rubber compositions that can be dried on a mill ready for calendering, extruding, or molding are practical according to a recently patented method.[1]

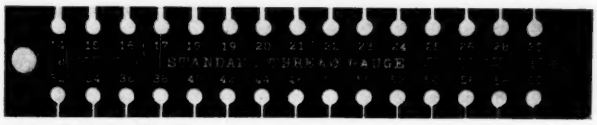
The crumb-like character is obtained first by adding to an aqueous dispersion of rubber certain compounding ingredients, but which when added in sufficient amounts to latex cause coagulation. Their coagulative effect is, however, arrested at this stage by suitable stabilizing substances, until the latex and compounding ingredients have been thoroughly mixed.

The protective influence of the stabilizing agents are then lowered by the presence of other specified compounding ingredients added in sufficient quantity to induce agglomeration or incipient coagulation, but insufficient to lead to the formation of a coherent coagulum.

[1] U. S. patent No. 1,952,041, Mar. 20, 1934.

Rubber Thread in Narrow Fabrics[1]

Edwin J. Gibbons [2]



Brown & Sharpe Mfg. Co.

Fig. 1. Standard Rubber Thread Gage

RUBBER thread is employed in narrow woven fabrics as warp or filling, or both warp and filling, to lend elasticity to the material warp-wise or filling-wise, or both warp-wise and filling-wise, and is incorporated in the process of weaving. It may be used in the natural color, or it may be tinted various hues, such as red, brown, pink, black, green, blue-white, etc.

There are 3 forms in which rubber thread is commonly encountered in narrow fabrics: viz., square-cut, flat, and round. The square-cut and round rubber threads are often covered by a winding process with cotton, cotton and rayon, cotton and silk, or cotton, rayon, and silk. The flat rubbers are generally used uncovered.

Two common types of rubber appear: wild or Para, deriving its name from the principal rubber port on the Amazon River; and cultivated or plantation rubber. Although wild rubber was the only type available in commercial quantities until the last few years of the nineteenth century and as recently as 1909 constituted all but about 6% of the world's supply, today it constitutes not more than 3% of the world's output. Para rubber, however, because of its superiority in the qualities required, is used almost exclusively in the manufacture of rubber thread, and the supply comes from Brazil, South America.

The form in which the raw rubber is received at the rubber thread factory is the original biscuit of the wild rubber industry. These are built up layer by layer by the native as he alternately applies the rubber milk (termed latex) to a stick or paddle and coagulates each application by slowly revolving the stick over an inverted funnel-shaped palm-nut smoker.

Upon the receipt of the biscuits at the rubber thread plant they are broken down, i.e., cut into chunks, shredded, and ground, and all impurities are removed by washing. The vulcanizing ingredients, principally sulphur, are then incorporated, and the coloring matter, if any is required, is introduced. The compound is next run through a calender and emerges in the form of a thin sheet, 36 to 56 inches wide and 70 to 120 yards long, depending upon the practice at the particular plant. The thickness of the sheets is gaged in hundredths of an inch, and the gage is carefully controlled by very delicate instruments. The next process is vulcanization, the term applied to the action taking place when sulphur-impregnated rubber is subjected to a high, moist heat while under pressure. In rubber terms this is called curing and results in tensile and wearing qualities without which the rubber could not be used.

In the vulcanization of rubber thread the sheets of rubber are wound on a drum 24 to 30 inches in diameter, together with a sheet of cotton cloth or liner. The cotton sheets, longer and wider than the rubber ones, act as insulators or separators for the successive windings of the rubber sheets to prevent adhesion. The drum with the rubber and the cloth liners is placed into a vulcanizer; its cover fastened securely, and live steam introduced. The length of time the rubber is subjected to the action of the steam, together with the degree of temperature and pressure maintained throughout the period, determines the quality of the cure. If the period is too short, the temperature too low, or the pressure insufficient, the batch of rubber is liable to be too soft and lack "kick." If the period is prolonged, the temperature too high, or the pressure excessive, the batch is liable to be deficient in strength and will rot readily.

After vulcanization the sheets of rubber are unwound from the drums and hung to dry. When dry, they are wound on another drum, the diameter of which is 6 to 7 feet, and the ends of the sheets are secured. Then as the drum very slowly revolves, a small, high speed, circular knife is brought to bear upon the rubber. This knife travels across the face of the drum by means of a long lead screw, and the relative speed at which it traverses the face of the drum determines the width of the cut and, consequently, the width of the rubber thread.

After cutting, the numerous ends of the cut sheet are tied together; and as the drum is slowly unwound, the rubber thread may be dusted lightly with talc to prevent the cut edges from adhering to each other. After another washing and drying the cut sheet is linked according to the old, familiar chain stitch and in this form is termed a chain of rubber.

The specific gravity of raw rubber is approximately 0.92. After the rubber has been converted to thread the specific gravity will, naturally, have been altered somewhat by the addition of the various ingredients that have been introduced in the process of conversion.

Square-Cut Rubber Thread

Square-cut rubber thread is numbered according to its dimensions, i.e., gage of the sheet from which it was cut and the width of the cut, in fractional parts of an inch; in other words, the number of ends that will lie side by side in one inch. For example: a No. 30 cut rubber should measure 1/30 part of

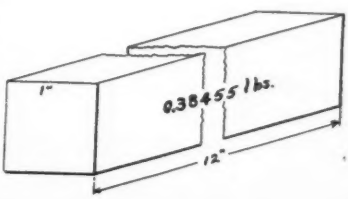


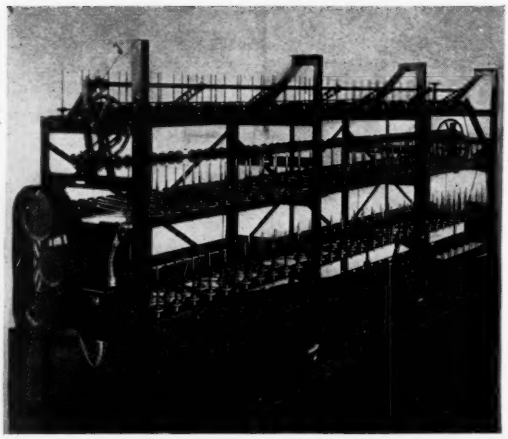
Fig. 2. Standard for Calculating Thread by Weight

[1] All rights reserved by the author.
[2] Textile designer, Russell Mfg. Co., Middletown, Conn.

an inch either way, that is, width and thickness, and 30 ends placed side by side should measure one inch. The range is from No. 4 to No. 75 or even finer, but the most common sizes used in the manufacture of narrow woven fabrics range from No. 28 to No. 44.

The size or number of a given rubber thread may most readily be determined by using a standard rubber thread gage, such as shown in Figure 1.

In gaging the rubber the thread should not be forced into the slot, but should slip in almost of its own accord. If the thread has been recently extracted from a piece of webbing in which it was tightly confined for some time, it is advisable to assume that it was originally one size coarser than the present gage test indicates.



H. H. Arnold Co., Inc.

Fig. 3. Standard-Type Rubber Covering Machine

Two methods are used to determine the amount of rubber thread required to produce a specified quantity of a given elastic fabric. One way is to extract all of the rubber from a definite length of webbing, weigh it on a delicate scale, and then calculate by direct proportion the amount of rubber thread required. The other method is to gage the size of the rubber thread, determine the length required to make a specified length of webbing, and then calculate the amount of rubber thread required according to the number of yards per pound of that particular size of rubber.

There is no universally recognized standard for calculating rubber thread by weight. However, to establish some basis for calculating rubber thread, it may be supposed that a block of No. 1 rubber one inch wide, one inch thick, and 12 inches long will weigh approximately 0.38455-pound. See Figure 2. This arbitrary standard, devised many years ago by a manufacturer of rubber thread, is used by some webbing manufacturers.

Based on this arbitrary figure, one yard of No. 1 rubber would weigh 1.15365 pounds; one gross yards (144 yards) would weigh 166.1256 pounds; and one pound of rubber an inch square would measure 31.2053 inches long or 0.866814-yard. As has been stated, these weights can only be approximate, but they will be found sufficiently accurate for most practical purposes.

Rubber Thread Calculations

1. The approximate number of yards per pound of any number square-cut rubber may be determined by the equation:

$$\frac{\text{square of count}}{1.15365}$$

Example: What is the number of yards per pound of No. 20 square-cut rubber?

Solution: $\dfrac{20 \times 20}{1.15365} = 346.7256$ yards

2. The approximate weight of 144 yards, or one gross, of any number square-cut rubber thread may be determined by the equation:

$$\frac{166.1256}{\text{square of count}}$$

Example: What is the weight of 144 yards of No. 40 square-cut rubber?

Solution: $\dfrac{166.1256}{40 \times 40} = 0.103828$-pound

3. The approximate weight per gross yards of any number of ends of a given number square-cut rubber may be determined by the equation:

$$\frac{166.1256 \times \text{number of ends}}{\text{square of count}}$$

Example: What is the weight per gross yards of warp consisting of 14 ends of No. 36 square-cut rubber?

Solution:

$$\frac{166.1256 \times 14}{36 \times 36} = 1.794 \text{ pounds}$$

Note. The weights so determined are for the rubber as it lies, that is, with no tension applied.

As the extracted length of any rubber thread is always considerably less than the length of the sample of webbing from which it was extracted, so the length of rubber required for any given length of webbing must be multiplied by the ratio of the extracted rubber length to the sample length. If, for example, the rubber threads extracted from a 3-inch sample of webbing measure only one inch, the length of rubber required for any given length of that webbing will be 33⅓% of the length of the webbing. This figure may be termed the rubber ratio.

4. The weight of rubber thread required per gross of webbing, when the rubber size, number of ends, and rubber ratio are given, may be determined by the following equation:

$$\frac{166.1256 \times \text{number of ends} \times \text{rubber ratio}}{\text{square of count}}$$

Example: What weight of rubber will be required for one gross webbing employing 18 ends of No. 28 square-cut rubber with a rubber ratio of 34%?

Solution: $\dfrac{166.1256 \times 18 \times 0.34}{28 \times 28} = 1.2966$ pounds

Flat Rubber Thread

Flat rubber thread likewise is designated by thickness and width. For instance, a rubber thread designated 28 by 1/8 indicates it was cut from a sheet gaging No. 28 and was cut ⅛-inch wide.

The equations given for square-cut rubber are equally applicable to flat rubber thread. For instance:

5. The number of yards per pound of any flat rubber thread may be determined by the equation:

$$\frac{\text{thickness (i.e. gage)} \times \text{width}}{1.15365}$$

6. The weight per gross (144 yards) any number flat rubber thread may be determined by the equation:

$$\frac{166.1256}{\text{thickness} \times \text{width}}$$

7. The weight per gross of any number of ends of flat rubber thread may be determined by the equation:

$$\frac{166.1256 \times \text{ends}}{\text{thickness} \times \text{width}}$$

8. The weight of rubber required per gross webbing, when the rubber count, number of ends, and rubber ratio are given, may be determined by the equation:

$$\frac{166.1256 \times \text{ends} \times \text{rubber ratio}}{\text{thickness} \times \text{width}}$$

(To be concluded)

Lacquering Rubber Goods

George Warren Smith [1]

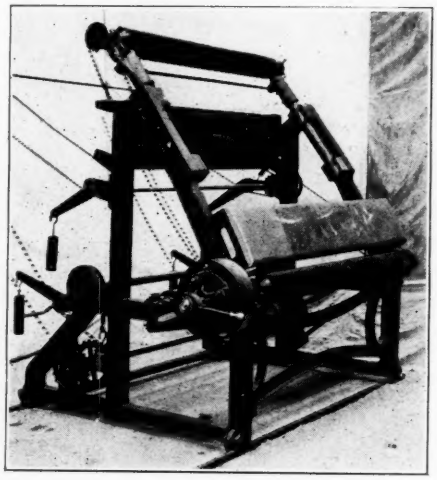


Fig. 1. Farrel-Birmingham Varnish Machine

Fig. 2. Paasche Golf Ball Airfinisher

THE use of nitrocellulose lacquer as a finish coating for rubber goods owes its increasing popularity to a few unique properties. With a coating of lacquer, rubber loses its characteristic tacky surface and feels much like glazed leather. The soft, easily scratched rubber surface becomes hard and markproof. Any desired degree of gloss or dullness can be procured; and when pigmented lacquers are used, better color is attained while imperfections in the rubber surface are covered up. The rapid drying qualities of lacquer facilitate its use, and it is readily applied by spray, dip, or coating machine.

Mark Resistance

The hard mark resisting finish that is produced by lacquer is of great importance in coated fabrics such as leatherette. Much of this fabric is made into garments, and in the stitching and fabrication of the garment the lacquer finish prevents the surface from being badly marred. Many garments made from this type of fabric are sold to compete with leather garments, and in such cases the hard leather-like surface imparted by the lacquer is important. The dry surface obtained with lacquer makes it possible to store the garments in piles without danger of sticking or picking up lint.

The markproof surface is of equal importance on many other articles. A lacquered hot water bottle, in addition to having a superior glass-like appearance, does not chafe and scratch in the carton during shipment. Similarly a lacquered rubber boot reaches its market with excellent appearance.

Variations of Gloss

Since many rubber products are made to simulate leather, it is important that luster be variable to match specific leathers and to follow style trends. With a lacquer finished rubber product this is a simple matter. The degree of luster can be controlled by varying the condition of the rubber surface before lacquering or by selecting lacquers of the desired degree of gloss. Oftentimes combinations of treating the rubber surface and subsequently coating with a lacquer of selected luster will give a finish difficult to match by adjusting the lacquer alone.

Clear and Pigmented Lacquers

From the standpoint of manufacturing simplicity clear lacquers are more desirable than colored lacquers. Clear lacquers make it possible to use one lacquer over all colors, which reduces the necessary stock and also eliminates the necessity of cleaning up machinery when changing from one color of rubber to another. Clear lacquers give satisfactory results on certain types of molded goods and some leatherettes. There are certain cases where clear lacquers are not so satisfactory as the pigmented variety because besides changing the color of the lacquer the pigment changes the physical characteristics of the film. A piece of brown leatherette made by coating brown rubberized fabric with brown lacquer resembles leather much closer than if clear lacquer were used in place of the pigmented brown lacquer. The pigmented lacquer imparts a more leather-like feel; while the depth of color is better. When clear lacquers are used, they are generally satisfactory over all colors except black, and to get good color on black it is customary to add a small amount of black dye to the lacquer.

Curing and Air Drying Lacquers

Nitrocellulose lacquers can be applied to rubber either before or after vulcanization. It is a good general rule, however, to apply lacquer before vulcanization whenever possible, making sure, of course, to use a special vul-

[1] The Stanley Chemical Co., E. Berlin, Conn.

canizing lacquer. The adhesion of a lacquer that has been through a cure is far superior to one applied afterward, and certain lacquers are insoluble in all common solvents after curing. Some curing lacquers develop such excellent adhesion during vulcanization that it is impossible later to separate or remove the film. Many rubber articles such as molded goods must be lacquered after vulcanization; so lacquers have been developed which make very satisfactory coatings for these articles. As a rule this type of rubber article is fairly rigid and generally can be encased or coated nearly all over with lacquer, which factors are helpful. Whether the lacquer is applied before or after vulcanization, it is essential to apply an extremely thin coating, never any more than is necessary to give the desired protection. A thin film in addition to costing less develops better adhesion and has less tendency to crack.

Cracking

Cracking of lacquer films on rubber is relatively unimportant if the cracks are of the proper type. Cracking is commonly considered a forerunner of trouble and oftentimes is. If a lacquer film cracks and can be rubbed off easily, it is undesirable. But a lacquer that cracks and at the same time maintains good adhesion may be very desirable. The cracks should be so fine as to be scarcely visible to the naked eye. When observed under a microscope, the lacquer between the cracks should lie flat on the rubber, for any tendency to curl up at the edges indicates poor adhesion. The reason for designing lacquers that crack is to compensate for the difference in elongation between the rubber and the lacquer film. A lacquer film broken up by invisible hairline cracks will stand considerable stretch because between each crack is nothing but the base rubber. Furthermore a lacquer formulated to crack correctly always gives a drier surface than a continuous film lacquer.

Method of Application

Lacquer can be applied to rubber satisfactorily by dipping, spraying, or machine coating. The type of rubber article to be coated and the quality of finish required determine the method. Many small molded articles can be coated satisfactorily by dipping. Hand dipping gives fair results, but timed machine dipping is usually superior. Articles not symmetrical in shape usually offer some difficulty in dipping by causing sags and runs. Such articles can be finished very neatly by spraying either by hand or automatically. Hand spraying is an operation quickly learned, and workmen who have never used a spray gun rapidly become experts. When the volume is sufficient, an automatic spray machine can be designed that will coat objects of most any shape more uniformly than by hand spraying and at a fraction of the cost. A common type of automatic spray machine consists of a turntable with one or more guns mounted at a fixed point just outside its periphery. The objects to be sprayed are placed on pins near the edge of the turntable, and, as the table revolves, the objects pass by the guns. The guns may spray continuously or may be tripped by cams; they may move to follow the object or may remain stationary. If the object is symmetrical in shape, it may spin as it passes the guns; otherwise 2 or more sets of guns may be necessary to assure uniformity of coating. One example of where such automatic spraying has been carried out successfully is in the spraying of golf balls.

The application of lacquer to the rubber surface of leatherette or similar rubberized fabrics is generally made by the use of a knife-type coating machine. One method uses a regular pyroxylin coating machine, or, if that is not available, an ordinary rubber spreader is very satisfactory. When this type of machine is used, the roll of rubberized fabric is brought directly from the calender to the coating machine. For lacquering on this machine a lacquer must be used which will dry completely by the time it reaches the wind-up, for then no interliner is required. The film of lacquer applied at this point should be extremely thin. After coating with lacquer the roll of leatherette is next embossed and finally vulcanized. The important feature of this method of coating is the clean embossing obtained since the lacquer is applied prior to graining.

Another method of lacquering the same kind of rubberized fabric is to apply the lacquer on a knife-type coating machine at the entrance of the vulcanizer. This type of machine applies the lacquer in similar fashion to the machine mentioned above except that the application in this case must take place after embossing. This machine is commonly referred to as a "varnish" machine, and it festoons the coated fabric directly into the vulcanizer. This action makes it unnecessary for the lacquer to dry as rapidly as required in spreader application. Provided that the cure gives the lacquer its proper characteristics, the rate of drying may be forgotten. This method of application eliminates one handling over the previously mentioned method, but the embossing is less sharp.

Much thought has been given to applying lacquer to rubberized fabrics by spraying. It seems quite possible that definite and satisfactory spraying methods will be developed, and in many ways successful spraying would be most advantageous.

Rubber Cements

(*Continued from page* 29)

dispersed in it as a fine suspension. The following is given by one authority as a formula for a latex cement:

FORMULA NO. 6. (LATEX CEMENT)

Ingredients	Parts by Weight
Rubber latex (33% rubber content)	300
Zinc oxide	1
Zimate	1
Captax	1
Sulphur	1
Antioxidant	1

Before adding the ingredients to the latex they should be ground for 12 hours or more in a ball mill with water. Less sulphur and zinc oxide are needed than in a corresponding rubber cement (formula No. 2). Care must be observed in adding ingredients to rubber latex so as not to cause the rubber to coagulate.

A rubber film deposited from this latex cement vulcanizes readily in boiling water. It is stated that it will vulcanize in 15 minutes in an oven at 175° F.

While normal latex contains 30 to 40% of rubber, it has been found possible to remove a portion of the water and by adding certain materials to prevent coagulation, to produce a latex containing as much as 75% of rubber.

There has come into the market a vulcanized latex, or Vultex. This consists of ordinary latex in which the rubber particles have been vulcanized by chemical means. Simple evaporation of the water from this material leaves a vulcanized rubber. This product requires no mixing or compounding and needs no heating or other treatment after application. From the standpoint of simplicity and convenience it leaves little to be desired.

There are many patents relating to rubber latex and anyone utilizing this material should give consideration to the patent situation.

(*To be continued*)

Rubber Absorption[1]

United States Absorption of Crude Rubber during 1933

TABLE 1. CRUDE RUBBER ABSORPTION

Year.	Absorption for Tyres. (Tons.)	Absorption for other Products. (Tons.)	Total Absorption (a). (Tons.)	Tyre Absorption as a percentage of Total.	U.S.A. Absorption as a percentage of World.
	(1)	(2)	(3)	(4)	(5)
1928 ..	378,000	64,000	442,000	86	65
1929 ..	393,000	73,000	466,000	84	58
1930 ..	305,000	66,000	371,000	82	52
1931 ..	283,000	64,000	347,000	82	51
1932 ..	269,000	63,000	332,000	81	48
1933 ..	317,000	89,000	406,000	78	50

IT WILL be noticed that during 1933 the percentage of total absorption which went into tires further declined. Part of the reduction in this percentage from 1928 to 1932 was due to the relatively greater reduction in the use of reclaim in products other than tires. Although no information is available concerning the use of reclaim by products during 1933, for all products together there was a further fall in the absorption of reclaim as a percentage of crude (See Table 4), though not to so large an extent as in previous years. It is probable, therefore, that the increased absorption for other products represents a real extension in the use of these products.

TABLE 2. ABSORPTION IN TIRES
(000 Long Tons)

Year.	Automobile Tyres.		Solid and Cushion Tyres.	Other Tyres, Tyre Sundries and Repair Materials.	Total Absorption.
	Casings.	Tubes.			
1928	295	61	14	8	378
1929	313	62	11	7	393
1930	244	50	5	6	305
1931	231	43	4	5	283
1932	225	37	2	5	269
1933	266	42	2	7	317

The number of automobile registrations showed a further reduction from 24,300,000 at the end of 1932 to 23,800,000 at the end of 1933, but the production of automobiles increased over 40%, from 1,373,000 in 1932 to 1,959,000 in 1933. It is not surprising, therefore, that a very large part of the increase in crude rubber absorption for tires was for new automobiles. Larger tires may also account for greater rubber consumption in 1933. This is indicated by the fact that the average crude rubber content in tires increased from 10.4 pounds in 1931 to 12.4 pounds in 1932 and 13.4 pounds in 1933; however part of this may be due to the use of larger proportions of crude rubber in the mix.

TABLE 3. ABSORPTION IN PRODUCTS OTHER THAN TIRES
(Long Tons)

	1928.	1929.	1930	1931.	1932.	1933
Mechanical Rubber Goods ..	19,450	24,220	20,347	19,549	16,784	28,033
Boots and Shoes	18,363	20,624	16,050	12,271	14,049	19,634
Insulated Wire	3,743	4,146	4,358	3,998	2,562	3,052
Surgical Goods	1,714	2,215	1,717	1,754	1,947	2,229
Stationers' Goods	1,382	1,441	1,448	1,336	1,283	1,412
Bathing Apparel	682	832	710	903	1,059	1,273
Rubber Clothing	1,357	1,608	1,142	993	954	946
Automobile Fabrics	1,045	1,388	960	712	500	894
Other Fabrics	2,432	2,559	2,427	2,691	3,030	4,399
Hard Rubber Goods	1,207	1,384	1,233	1,109	1,038	1,292
Heels and Soles	6,077	6,867	7,421	9,771	11,668	16,492
Flooring	1,154	1,220	1,193	1,152	1,079	916
Toys and Novelties ..	1,500	1,701	2,415	2,305	1,739	1,572
Miscellaneous	3,493	3,008	4,276	4,970	5,309	6,855
Total	63,599	73,213	65,697	63,514	63,001	88,999

Table 3 gives detailed figures of absorption by type of product from 1928 to 1933. During 1933 there was an all-round increase except for rubber clothing, flooring, toys, and novelties. Of the total increase of 26,000 tons in the absorption for other products, mechanical rubber goods accounted for 11,000 tons, boots and shoes for 6,000 tons, and heels and soles for 5,000 tons.

TABLE 4. ABSORPTION OF RECLAIM

Year.	Absorption of Crude Rubber (Long Tons)	Absorption of Reclaim (Long Tons)	Per cent Reclaim to Crude.	Price of Crude New York (Cents)	Price of Tyre-Reclaim (Cents)
	(1)	(2)	(3)	(4)	(5)
1928 ..	440,000	223,000	50·1	25·0	8·2
1929 ..	470,000	212,700	45·3	19·1	7·9
1930 ..	378,000	153,500	40·6	11·81	6·6
1931 ..	349,000	125,400	35·9	6·03	5·1
1932 ..	332,000	77,500	23·3	3·38	3·8
1933 ..	406,000	81,600	20·1	5·86	4·5

Table 4 gives the principal facts in regard to the relation of crude to reclaim absorption from 1928 to 1933. At the beginning of 1933 the price of crude rubber was considerably below that of good quality tire reclaim, but although the price of reclaim rose with the revival of the rubber industry, it was exceeded by the price of crude about the middle of the year. There was some increase in the use of reclaim during the second half of the year, but for the year as a whole the percentage of reclaim absorption to crude fell from 23.3% in 1932 to 20.1% in 1933. It is difficult to say to what extent the premium on crude rubber will cause an increase in reclaim absorption. The reaction during the second half of the year was not so much as might be expected, and for the first 2 months of 1934 the percentage figures of reclaim to crude were lower than in the same 2 months of 1933, but a longer period must elapse before definite conclusions can be drawn.

TABLE 5. SEASONAL RUBBER ABSORPTION

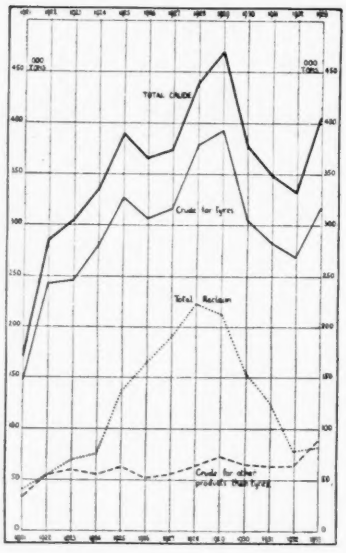
Month.	Seasonal Movement about Trend expressed as Percentage of Trend	Percentage Seasonal Distribution Assuming a Horizontal Trend	Seasonal Variation as a Percentage of the Monthly Average
January ..	+ 2·3	8·5	102
February ..	+ 0·6	8·4	101
March ..	+ 8·9	9·1	109
April	+11·1	9·2	110
May	+17·4	9·8	118
June	+18·6	9·9	119
July	+ 3·0	8·6	103
August ..	+ 1·0	8·4	101
September ..	− 9·4	7·5	90
October ..	− 9·6	7·5	90
November ..	−15·7	7·0	84
December ..	−26·9	6·1	73
Total ..		100·0	

In view of the marked seasonal movements in the absorption of crude rubber by the United States manufacturers, a study was made, based on the monthly R.M.A. figures from 1927-32, with the object of giving numerical expression to seasonal influences. The actual

[1] *Bull. Rubber Growers' Assocn.*, Apr., 1934, pp. 201-10. Tabulations compiled from Rubber Manufacturers Association statistics.

variations in absorption are due, of course, not only to seasonal influences, but also to trend and random causes, such as strikes. An attempt has been made to eliminate the last 2 factors from the figures by generally accepted statistical methods, leaving a series which represents movements due to seasonal causes. It should be mentioned, however, that the June figure is slightly higher than it should be owing to the effect of the abnormally high absorption in June, 1932, brought about by the imposition of an excise tax on the production of tires. Determined in this manner, the seasonal variation in United States crude rubber absorption may be expressed in any of the 3 ways given in the 3 columns of Table 5.

Thus it may be said that, assuming a level trend and freedom from random causes, maximum absorption would occur about May. After that, would be a decline to December, the lowest month, with a possible secondary peak about August, which is not revealed in the above figures, but is indicated in certain years. January to May would be a period of increasing activity.



U. S. Absorption of Crude Rubber for Tires, Other Products, and Reclaim—1921-1933

Absorption in 1934 [2]

The absorption of the United States during the first quarter of 1934 amounted to 129,000 tons—an increase of about 66,000 tons over the corresponding figure for 1933. The deliveries to manufacturers in the United Kingdom during the same period amounted to 26,000 tons and also showed an increase of about 9,000 tons over the corresponding deliveries during 1933. No data for net imports into other countries during March, 1934, are yet available, but such 1934 data as have been published indicate that the imports will be greater during the first quarter of this year than in the corresponding period of 1933.

[2] *Ibid.*, p. 214.

The Truth about Rubber Paving

Allan Williams

THE truth is that rubber pavement is second to none. The proof of rubber's resistance to abrasion is that ball mills lined with rubber will outlast 2 steel-lined mills. There is very little difference in skidding on rubber pavement, whether it is wet or dry. Snow melts quicker on rubber pavement than on any other. Concrete and asphalt pavements show greater wear since the advent of balloon tires owing to a greater vacuum behind the tires.

The trouble with road building today is that ample profit is the first consideration, and where specifications call for a 6-inch underbed, there are many places where it is not more than 3 inches. All roads should have an 8-inch underbed to withstand the impacts from the heavy trucks. Rubber pavement with an 8-inch concrete underbed would be indestructible if means could be devised to fasten it down and to resist the traction wave.

The traction wave makes a letter "S" where traffic is both ways on the same street, the convex surface line going with the traffic. This action happens on wood pavement, Belgian blocks, brick, asphalt, and solid rubber bricks loosely laid on the underbed with pitch between the joints. The rubber capped concrete blocks both square and octagon with striated surfaces are only satisfactory in light traffic. Heavy traffic pulverizes the concrete part of the block, and the rubber cap comes loose. Water seeps between the joints which adds to the blocks' destruction.

Rubber pavement requires little or no repairs. Asphalt is the lowest in initial price, but constant replacement caused by summers' heat soon makes it the most expensive. Repairs due to frequent rain on wood pavement are expensive also.

It is common knowledge to all manufacturers who have experimented with rubber pavements that the $22.50 per square yard quoted in London is somewhat out of proportion. The last large installation in the United States of pavements, when rubber was 13¢ per pound, cost $14.00 per square yard without the underbed, and a concrete 6-inch underbed could be laid down for $1.60 per square yard. It is difficult to understand how London can afford to pay such a price for rubber pavement, and yet in the United States the city engineers would not give rubber a fair trial because of the high cost. Tests in London show that rubber pavement has reduced the vibration of tall buildings 35%. This should indicate a longer life for rubber paved bridges because vibration is a great detriment to them. Wood pavement is a failure on bridges because of expansion and contraction in wet and dry weather.

The results of vibration on a long bridge are exemplified in the wood pavement laid on Queensboro Bridge, New York. The wood blocks were bedded on concrete laid over the buckle plates, and when taken up, the blocks were worn down 2½ inches from 4 inches on the underneath surface and very little on the top surface. The wearing underneath was due to the traction wave which caused the blocks to shift to and fro, and the heavy traffic loads soon pulverized the blocks and the concrete underbed. At the present time the bridge has a steel plating over the "I" beam, and wood blocks are laid in pitch with an expansion joint every 10 rows.

Since 1922, England has had 8 installations, Holland one, France one, Straits Settlements one, and the United States but one, the Chicago Avenue Bridge in Chicago, Ill. This bridge proved that rubber blocks pulverized and wore the wood planking underneath very rapidly.

The inventor of a practical rubber pavement will reap a rich reward, and if only bridges and streets around hospitals and schools were paved with rubber, the industry would be second only to rubber tires.

Annals of Rubber

Chronological Record of the Important Events in the History of Rubber

A. D. 1519. HERRERA-TORDESILLAS (Antonio de), one of the most prominent historians of Spain, after describing in Book V, Chapter III, of "The General History of the Vast Continent and Islands of America," "the reception that mighty prince (Montezuma) gave Cortes in" Mexico City, thus details the *Flaschti:*

". . . The ball was made of the gum of a tree that grows in hot countries, which having holes made in it distils great white drops that soon harden, and being worked and moulded together turn as black as pitch. The balls made thereof, though hard and heavy to the hand, did bound and fly as well as our footballs, there being no need to blow them. . . . They might strike it every time it rebounded, which it would do several times one after another . . . ."

Elsewhere, Herrera states that for the game of ball the natives of Haiti "had a house set apart, and they played it so many on a side without sticks or bats, for they struck the balls with any part of their bodies and with great dexterity and nimbleness. And the balls were of the gum of a tree, and although larger were lighter and bounced better than the wind-balls of Castile."

He also alludes to the Cazique having put upon him "clouts daub'd with a sort of gum;" also to the natives of *Tierra Firme* who "on their festivals, painted or daub'd themselves with a sort of clammy gum, sticking on it feathers of several colors."

In Vol. III, Book X, Chap. V, he says that, in the Province of Cumana, "there are trees, which having an incision made in them, a sort of milk runs from them which hardens into a white gum."

Allusion is also made to "the tree called *tabernaculo* (at Puerto Rico), from which flows a white rosin like gum anime, us'd instead of tar for ships;" likewise to "the trees that yield gum anime. . . ."

1615. TORQUEMADA (F. Juan de) in the third volume of his "De La Monarquia Indiana," of which the first edition appeared in 1615, describes the Mexican Indians as making shoes, headgear, clothing, and other water-tight articles of the gum of a tree "which the natives call uléquahuitl (*castillao elastica*), which is held in great estimation and grows in this hot country . . . . it yields a white milky substance. To obtain it, the tree is wounded with an ax or cutlass, and from these wounds the liquid drops. The natives collect it in round vessels" wherein they allow it "to settle in round balls. . . . They used to play with these balls, striking them against the ground and making them raise to a great height."

1627. WOLFEN (John Jasper) is granted in England the right "for and during the terme of fourteen yeres, to use or exercise, practize or putt in use, a newe invencion for the making and preparing of certaine stuffs and skynns to hould out the wett and rayne;" and to "make, frame, sett upp or use all such engynes, instrumentes and devises" as the patentee shall have discovered "to purposes aforesaide," on payment of the "yerely rente of five poundes of lawfull money of Englande."

1634. EYRES (John), MOWATE (Charles), WALLES (John) are granted for the term of 14 years the exclusive right to use in England their process "whereby to make wollen cloths impenitrable of rayne."

1656. TRADESCANT (John), distinguished traveler and naturalist, issues a catalogue of the rarities preserved at South Lambeth (Museum Tradescantium) wherein is given the earliest notice of the appearance of gutta percha in England, viz: "VIII. The plyable mazer wood, being warmed, will work to any form." The Tradescant Museum passed into the hands of Dr. Elias Ashmole, and was by him transferred to the University at Oxford, where it was destroyed in 1755.

1736-1744. LA CONDAMINE (Charles Marie de), a French savant who was sent by the King of France, in company with Bouguer and Godin, for the purpose of measuring a degree of the meridian, brings, on his return journey to Europe, the first specimens of caoutchouc from Peru by way of the Amazon. He reports having also found this "most singular resin" to the north of Quito, in Ecuador, from a tree named *hhévé* or *hyévé*, and where it was called *pao de xyringa* by the Portuguese colonists. The results of his observations were published in the *Transactions de L'Académie des Sciences*, wherein he describes the various methods of collecting the juice and of treating it for the production of many useful articles.

1751. The *cachuchu, cahuchu*, caoutchouc (pronounced koo-chook) tree is discovered in the colony of Cayenne, French Guiana, by Fresnau, and, through his friend, De la Condamine, it is described in the "Mémoires de L'Académie Royale" during the same year.

1761-1763. HERISSANT and MACQUER publish in the "Mémoires de L'Académie" the result of their chemical investigations of india rubber solutions. Five years later Macquer reports fully on the means of dissolving the "resin caoutchouc" in ether (*sans de dénaturer*), and of repeatedly coating caoutchouc forms so that the latter will retain a covering of the gum after the evaporation of the ether. (*Ann. de Chimie*, XI, 147.)

1768. GROSSART (Chirly) alludes to the method of dissolving caoutchouc in ether as well as in volatile oils, and, in the memoir read before the Académie de Dijon, August 28, 1791, describes his process of constructing tubes of caoutchouc by rolling strips around glass cones and cylinders.

1770. PRIESTLY (Dr. Joseph), an English natural philosopher and theologian, in the preface to his work, "A Familiar Introduction to the Theory and Practice of Perspective," thus calls attention to caoutchouc: "Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black lead-pencil. It must, therefore, be of singular use to those who do practice much drawing. It is for sale by Mr. Nairne, Mathematical Instrument Maker, opposite the Royal Exchange. He sells a cubical piece of about half an inch for three shillings, and he says it will last several years."

(*To be continued*)

EDITORIALS

Rubber Industry Steadily Gains

RUBBER goods production commenced to become active soon after the banking moratorium in March of 1933. Since then rubber manufacturers both great and small have continued to report business increases each month that have kept pace with the general industrial expansion throughout the country.

Tire manufacturers have profited by the remarkable prosperity of the automobile industry and are today much better placed industrially than they have been for the past 4 years. Price stabilization and the willingness of the rubber manufacturers to cooperate with each other are important factors in this accomplishment.

The general plant activity which is said to be up 50% continues at present at a slightly reduced rate as compared to the same period a year ago. This trend is seasonal and is to be expected. The clothing and footwear divisions of the industry report a volume of output for the past 4 months 40% greater than in 1933. Much of the improved industrial position of rubber manufacturers is due to the beneficial effects of certain regulations provided by the rubber codes.

The most significant evidence of the industry's improvement over a year's period is the rubber consumption figures for 1933, which show a total of 405,687 long tons, representing an increase of 22% over the total consumption for 1932. These figures are the largest since 1929, when the United States consumed 466,475 long tons—the record figures for all time.

The first 4 months of the current year continue to reflect the broadening demand for rubber, with a total of 173,066 long tons, or a monthly average of 43,266 long tons. Stocks in the United States, however, are quite large; in fact there is more than a year's supply of crude rubber on hand, which will act as an effective balancing factor in future price advances.

With sales of rubber products constantly improving and the trend of prices steadily increasing, with every indication of an early settlement of the strike in Akron, the rubber outlook is very promising.

Anniversary of the NRA

THE first anniversary of the National Recovery Act occurred on June 16 and marked a year of remarkable progress toward relieving unemployment, eliminating destructive competition, rehabilitating business, and restoring the nation to a normal state of prosperity. The outstanding achievement of the first year of NRA government was placing 95% of industry under codes of fair competition. Following in importance have been the elimination of child labor, reduction in hours of labor, increases in pay rolls, control of price cutting, and the establishment of a system whereby industry can stabilize itself and put an end to practices harmful to consumer, employer, and workman.

To indicate a decided improvement in certain industries as the result of NRA activities the following figures are given.

Manufacturing production up 50%; department store sales up 46%; variety store sales up 86%; rural general store sales up 66%.

Automobile production went from 118,000 cars in March, 1933, to 336,013 in March, 1934, an increase of 184.8%. Iron and steel production increased 200%; bituminous coal 62.5%.

Electric power production is up 14.9%, Commerce Department figures show; freight car loadings are up 15.3%; magazine and newspaper lineage rose 23.5% and 35.7% respectively. April export figures are 70.9% greater than those of a year ago; imports have increased 59.6%.

It is pointed out by those who oppose the principles of the NRA that values have been raised by price control and open-price code regulations, and the resultant rise in prices has exceeded the increase in purchasing power of the people; also that the codes encourage monopoly and discourage the small industries by actual regulations and by the domination of code authorities controlled by integrated interests.

Another great problem facing the NRA for solution is that of labor, which centers around Section 7A the collective bargaining feature written with the intention of giving workers the right to bargain collectively with employers. This clause has been the cause of much trouble and continues to be the center of disturbance around which labor agitation and strikes are recurring. Labor claims that it recognizes their union; while NRA insists it does not recognize any union, but affords the workmen privilege to choose their own representatives.

The NRA plan is acknowledged by the administration to be an experiment, but it is flexible enough to change as requirements dictate. The new program of code enforcement will consider the constructive criticisms leveled at the NRA regulations and therefore result successfully in operation, for it is public opinion that will decide the effective enforcement and administration of the codes of fair competition and trade practice.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

Boston Group

THE spring meeting of the Boston Group, Rubber Division, American Chemical Society, held at Hotel Kenmore, Boston, Mass., on June 8, presented a program of exceptional interest that attracted an attendance of about 200. The general theme of the meeting was "Latex in Industry." The topics were treated in numerous papers and illustrated by a comprehensive exhibition of products.

Exhibits

Brown Co. Paper-latex substitute stocks for leather in shoe making.

United States Rubber Co. Latex impregnated web fabric for tire plies; Lexide, a latex treated cellulose base material; Lastex yarn; anti-squeak automobile body gaskets.

Naugatuck Chemical Co. Lotol latex compositions; artificial dispersions of rubber; latex backed carpeting.

Heveatex Corp. Samples of latex compositions for dipping; samples of fabric proofing, coating, and surface impregnation.

Vultex Chemical Co. Latex rubber shoes; rubber backed carpeting; rubber lined paper bags; impregnated leno mesh fabric; dipped balloons, gloves, and hat bags; Vultex adhesives.

Dewey & Almy Chemical Co. Latex can seals; label and shoe cements; Darex shoe soles; Goodyear welts; latex impregnated brake lining.

Simplex Wire & Cable Co. Latox lamp cord and cables for telephone, supervisory control, etc.

Chairman Dewey of Dewey & Almy Chemical Co. in his preliminary remarks stated that the commercial introduction of latex as a plantation product was featured by a rush for patent protection in the belief that all rubber products would be made with latex instead of dry rubber. Next followed a period of secrecy, failures, and discouragement in attempts to solve the industrial adaptability of latex. This stage was followed by the present era of accomplishment and recognition of the place of latex in the rubber industry and its applications in other industrial branches.

The program and exhibits were planned to present latex processes and products in a comprehensive manner the better to stimulate interest in latex and its industrial possibilities.

Abstracts of Papers

Latex. Latex is a relatively new commercial form of rubber. It has been adapted to processes in which the other forms of rubber are unsuited and it makes possible better products. The properties of latex can be greatly modified by physical and chemical conditions. This permits its use in a great variety of processes but also necessitates the use of precise methods to secure and maintain the properties required for the use to which it is to be put. Cord Impregnation. This is believed to be the first large scale industrial use of latex. Tire cords from a creel were passed through latex and the impregnated cord dried in sheet form by passage over a series of steam heated drums. This method produced a sheet of rubber impregnated cords with no cross threads and gave better flexing when built into a tire. Rubber Thread. Round section thread is made in continuous lengths by running a stream of latex into a liquid coagulant. The rubber thread formed is washed, dried, and vulcanized. It is subsequently converted into Lastex yarn for all textile uses by a cover winding of cotton, rayon, or other fibers. Rug Backing. Latex compositions are applied to back of plush carpeting and rugs to bind the textile construction and prevent slippage when walked upon. Inner Tubes. Excellent inner tubes can be made from latex by deposition of its rubber content on a porous mold by filtration. The increase in the price of rubber and improvements in inner tube making from dry rubber have caused the method to be abandoned. Fiber Latex Mixtures by the Beater Process. The Kaye process (1922) of beating latex and paper pulp in a paper engine has been perfected for the manufacture of stock for shoe doublers, artificial leathers, gaskets, anti-squeak shims, etc. The 6 preceding papers were by W. A. Gibbons, United States Rubber Co.

Coating of Wire. An outline was given of the special dipping method with vulcanized latex employed for insulating the conductors in the Latox line of lamp cords, telephone and other cables. The advantages secured by this process are: uniform vulcanization, thin and continuous insulation, normally long life, and small diameter and light weight of cable. Charles R. Boggs, Simplex Wire & Cable Co.

Proofing. The degree of surface impregnation of fabric by latex depends on clean condition of the fibers and the surface tension of the latex which can be depressed by wetting agents to improve the bonding of the first coat to the fabric. Vulcanization of the proofing may be done during drying of the spread coat. Cold vulcanization is not generally used. Doubling of proofed fabric may be done wet or dry. The advantages of proofing with latex are the elimination of solvents, milling, and sulphur curing, also heavier coatings can be applied and factory operating conditions improved. R. J. Noble, Heveatex Corp.

Sealing Compositions. Sealing of food packed tin cans was introduced in 1902. It is now common practice to seal 400 cans per minute with latex sealing cements. Not only does the cement resist the mechanical action of closing the can but it does not injure the food product and resists air aging well. Suitable viscosity is an essential working property to permit the discharge and spreading of the latex cement in the joint of high speed sealing machines. Kenneth Tator, Dewey & Almy Chemical Co.

Shoe Cements. Latex adhesive cements are made in 50 to 60 standard grades for the requirements of shoe and leather work beside as many more special grades for miscellaneous manufactures. Beside eliminating fire risk latex cements spread smoother and farther than rubber cements. H. M. Spelman, Jr., Dewey & Almy Chemical Co.

Dipped Goods. The advantages of ordinary latex dipping compounds over solvent cements are still further increased by employing Vultex or vulcanized latex. Contrary to expectation from our knowledge of dry rubber working, vulcanized latex dried films cohere into tough rubbery films exceeding in strength those obtained from vulcanizing solvent rubber dipped films. The scope of the dipping process has been greatly extended by latex. It is now utilized for the production of shoes, thin walled novelties, dental sheet stock, insulation, and even thick walled articles such as hat bags. H. J. Elwell, Vultex Chemical Co.

Brake Lining. The impregnation of asbestos fiber with latex as a binder is effected by 3 processes; namely, the open machine beater; the suction box

method whereby the pulp is agitated with latex in a preagitated condition; and by heat coagulating the latex-pulp mixture. J. A. Lunn, Dewey & Almy Chemical Co.

Rubber Footwear. Latex rubber shoes are variously produced. Large-scale production is conducted by the Anode method of electro-deposition. The shoe upper is deposited from the latex composition upon an aluminum last as a mold bearing an engraved design. When the deposited rubber is of sufficient thickness the upper is reversed from the last and placed upon a building last to be completed as a shoe by the addition of a sole and cured as a light, flexible shoe. L. H. L'Hollier, Hood Rubber Co.

Impregnation of Fibers. Spruce pulp fiber is impregnated with latex in such a manner as to successfully simulate leather for uppers, soling, and other parts of shoes. These materials can be manufactured into shoes on leather working shoe machinery and possess great beauty, durability, and economy. M. O. Schur, The Brown Co.

Compounding of Latex. Selection of the type of latex best suited for the results desired is the first step in latex compounding. Vulcanizing ingredients are chosen as in ordinary compounding according to type and time of cure. Practically all compounding ingredients must first be wetted or dispersed and suitable viscosity of the mixing be maintained to keep the vulcanizing agents and fillers in suspension. In highly filled mixes stabilizers are necessary to prevent coagulation and are preferably used in minimum amount. W. J. R. Hauser, Heveatex Corp.

Akron Group

THE Akron Group, Rubber Division, American Chemical Society, held its summer outing June 22 at the Fairlawn Heights Golf Club, Akron, O. The day was devoted to appropriate outdoor and indoor festivities with a golf tournament in which many prizes were awarded as the feature of the day. Dinner was served at the club house at 7:30 p.m.

Viscosity of Heavy Cement

A METHOD[1] to determine rapidly the viscosity of very viscous materials such as heavy rubber cement follows. A glass tube 1⅛-inch inside diameter, closed at one end with a cork or rubber stopper, is filled to a 100 cc. mark etched on the glass. With the cement at this mark the tube is inclined slightly from the vertical; a one-inch steel ball is dropped in, and the time noted. The progress of the ball downward is observed, and when it reaches the 50 cc. etched line, the time is taken as a measure of the viscosity. Corrections should be made for temperature.

[1] Devised by Frank L. Hall in the laboratory of the Converse Rubber Co., Malden, Mass.

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Age Resisting Compounds[1]

THE 1933 type of tread not only is far superior in original properties, but it is also very much superior in its resistance to the effects of the elements. It is common knowledge that rubber articles depreciate during use and, indeed, even during shelf storage. This depreciation is due at least in part to the effects of oxidation. Accordingly, a number of so-called accelerated aging tests have been devised to determine the susceptibility of a stock to oxidation. The 4 tread stocks in question have been exposed to oxygen gas at 158° F. and at 300 pounds' pressure for 46 hours. This treatment constitutes one of the common testing methods.

As previously pointed out, the effect of oxidation has been sharply reduced in the 1933 tread compound. The cause of this reduction in susceptibility to oxidation is to be found in the substance phenyl - beta - naphthylamine, which has been added for this specific purpose. The first reagent of this type marketed in the United States was aldol-alpha-naphthylamine, which came upon the market about 1926. A large number of substances have since been found to be effective in preventing premature deterioration. Hydroquinone, the well-known photographic developing agent, is very effective in improving the aging properties of rubber stock. The entire literature of aging and oxidation has recently been summarized by Dufraisse.

This development has made it possible for dealers to handle larger stocks of tires without risk of deterioration and has furnished the public with a product which retains its superior physical properties throughout its life. Materials similar to those which have been found useful in preventing oxidation in rubber are also being used in oil, gasoline, and probably other products. In the case of gasoline the deterioration involved is similar chemically to that occurring in the case of rubber. The oxidation process is accompanied by the formation of resinous material, which is objectionable because of its tendency to form carbon deposits in the engine.

[1] Extract from "The Automobile Tire of 1933 and Why It Gives Outstanding Service." By C. R. Park, Firestone Research Laboratory, Akron, O. Courtesy *Ind. Eng. Chem.*, News Ed., Dec. 10, 1933, pp. 343-45.

New Machines and Appliances

INTERESTING AND TIMELY PATENTS

THE arrangement of apparatus shown in elevation in Figure 1 is designed for continuous production of rubber shoe soles cut from embossed calendered stock.[1]

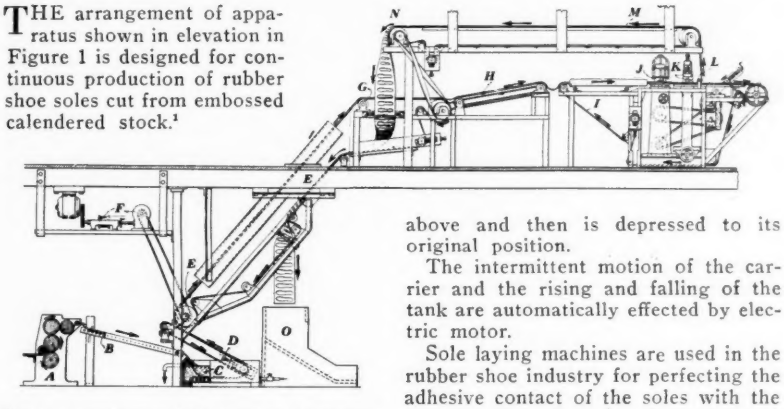


Fig. 1. Continuous Sole Cutting Apparatus

The calender *A* located on the first floor delivers embossed soling in continuous length upon a roller incline *B* that delivers the warm stock into a tank of water *C* which serves to cool and shrink the stock. From here the sheet ascends to the second floor by means of 2 belt conveyers *D* and *E* operated by power unit *F*. The upper flight of conveyer *E* is enclosed for protection of the stock.

At the second floor the conveyer *E* turns at *G* and deposits the stock on conveyer *H*, by which it is passed forward on the endless cutting apron *I* that delivers it to the cutting machine *J* and embossing machine *K*. The progress of conveyer *I* is interrupted periodically by the action of mechanism at this point to permit the cutting and the dieing machines to function properly.

As the cycles of feeding, cutting, and embossing continue, the waste stock is stripped from the cut soles at the stripping roller *L*, and the waste is drawn on conveyer *M*, which discharges it at point *N* for passage by the return flight of conveyer *E* to the scrap bin *O*.

The automatic dipping machine shown in Figure 2[2] obviates the difficulties in operation experienced with usual machines for the purpose. The construction is such that the dipping forms *A*, mounted on board racks, are carried in an endless path upon an endless carrier *B* moving at a fixed speed. While the carrier is still moving, a vertically movable tank *C*, containing the dipping mixture, rises to immerse the forms held by the carrier directly above and then is depressed to its original position.

The intermittent motion of the carrier and the rising and falling of the tank are automatically effected by electric motor.

Sole laying machines are used in the rubber shoe industry for perfecting the adhesive contact of the soles with the upper construction. An improved and recently patented[3] feature of machines for this purpose, shown in Figure 3, includes a 2-piece jack *A* and *B* for holding the shoe *C* against the pressure. The work engaging parts of the jack are quickly adjustable for shoes of different sizes, and means are provided for holding the toe piece *A* and heel piece *B* in adjusted position against the hydraulic pressure below the rubber diaphragm upon which the sole of the shoe rests during operation of the machine. The illustration pictures the construction and method of operation of the 2-piece jack.

The object of providing an unseamed bathing shoe which will neatly conform to the foot of the wearer and provide simplicity and accuracy in manufacture is met by a patented method[4] employing the hinged mold illustrated in Figure 4. The external mold parts and the shoe are shown in section, and the core or last in elevation. The upper mold section is shown in full lines as being closed and in dot and dash lines as being partly open.

The construction of the shoe follows. The heel consists of a solid wood or composition filler *A*, an arch stiffener *B* fastened to the heel filler by nails. An impervious molded rubber heel covering *C*, the molded outsole *D*, and insole *E* form the shoe bottom, which is molded integral with the rubber upper *F* having an ankle strap *G*.

The mold is provided with a last or core *H* having a shank *I* extending beyond its molding surface and fitting snugly into a cavity *J* in the lower section of the 2-part mold for accurately positioning the last.

The heel and sole portions of the shoe are formed by the cavity *K* in the plate *L*. The 2 parts of the mold separate along a parting surface *M*, which extends along the upper edge of the sole from the toe to the ball and

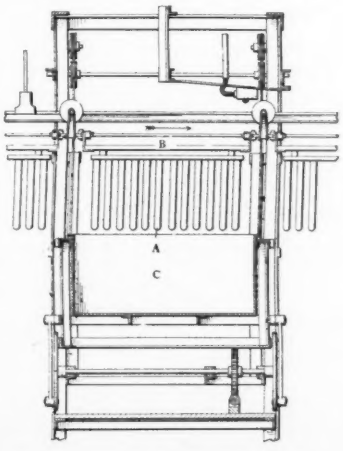


Fig. 2. Automatic Dipping Machine

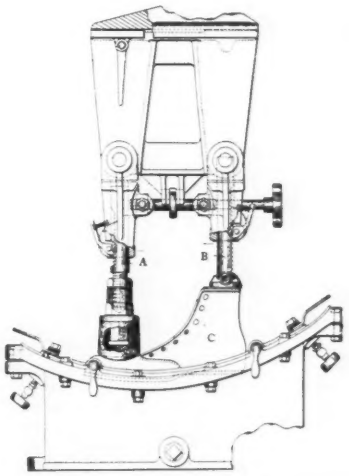


Fig. 3. Sole Laying Machine

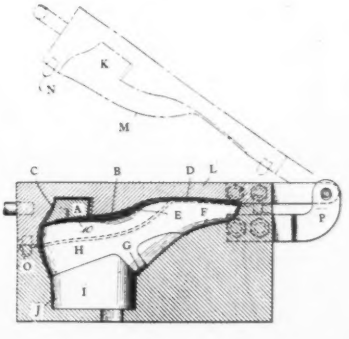


Fig. 4. Bathing Shoe Mold

[1] U. S. patent No. 1,942,398, Jan. 9, 1934.
[2] U. S. patent No. 1,946,360, Feb. 6, 1934.
[3] U. S. patent No. 1,944,882, Jan. 30, 1934.
[4] U. S. patent No. 1,947,173, Feb. 13, 1934.

then extends along the line of maximum horizontal bulging of the last to the heel portion of the upper. Dowel pins and sockets *N* and *O* are provided for alining the mold plates which may be hinged together at *P*.

Figure 5 represents in section a novel signal post comprising a body, upright or staff portion which, while retaining its stiffness, will readily yield in any direction when pushed from any side when it is well anchored in the ground.[5]

The body of the post is a tubular casing *A* of resilient waterproof material, such as rubber, reenforced by a coil spring *B* mounted in an upwardly extending open socket *C* provided in a concrete anchor *D* sunk in the ground below the surface. A flexible metal cable *E* is used to attach the flexible post to the anchor *D*, the lower end of the cable being formed into a closed loop *F*, which is embedded in the concrete anchor. The upper end of the post has a flanged cap *G* through which a threaded stud *H* carrying a ring *I* is passed and made fast to the upper end of the cable *E*.

When the post is forceably struck by a vehicle, it readily yields and is automatically restored to upright position when relieved of the lateral displacing force.

A novel and effective method[6] of welding together the edges of spirally wound rubber stock to form a seamless tube is pictured in Figure 6. Hitherto rubber tubing has been made from flat stock drawn through an opening in a movable plate. This opening is substantially the outside diameter of the finished tubing and gives it a longitudinal seam permanently welded by vulcanization.

The device pictured operates as follows to produce strong integral rubber tubing.

A carrier roller *A* for rubber is mounted on a shaft *B* held in a standard *C* swivelly mounted on a base *D*.

The carrier roller contains a roll of rubber ribbon *E* spirally wound on the mandrel *F* as the roller and the mandrel rotate. The contiguous seams formed by the edges of the ribbons are subjected to the hammering action of a rapidly oscillating hammer *G* against the seam. The mandrel splined in pinion, is shifted longitudinally by a flyer *H* engaging a flange *I* on the mandrel and threaded on a screw *J*, so as always to bring the seam formed by the contiguous edges of the ribbon over the hammer head.

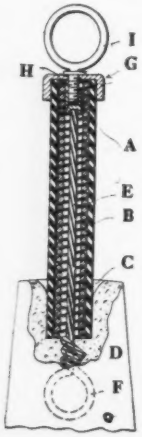


Fig. 5. Flexible Sign Post

[5] U. S. patent No. 1,939,968, Dec. 19, 1933.
[6] U. S. patent No. 1,940,145, Dec. 19, 1933.

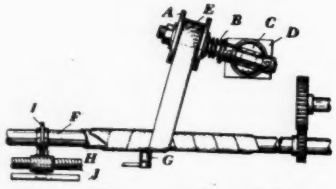


Fig. 6. Hammered Seam Tubing

If a multilayer tubing is desired, the manufacture is easily accomplished by reversing the mandrel rotation, thus forming each layer with its welded seams across the welded seam of the preceding layer.

When the tubing is to be used for quite high pressure fluids, a fabric layer may be utilized as reenforcing material between 2 layers of rubber.

The problems in the use of printing plates or blocks bearing lines of type, and sometimes devices which present unequal surface areas to the article to be printed are solved satisfactorily by proportioning the hardness of the rubber stocks used relative to the printing areas of the type or devices.[7] Thus the type having greater area and volume is made of lesser hardness than the type of lesser size; consequently the make-ready on printing cylinders or heads is made unnecessary, and the crushing of frail material to which the printed matter is applied is eliminated.

Figure 7 represents a plan view of a molded rubber printing plate comprising type lines in which the type is of varied size, together with a design or device of relatively great surface area. In such a plate the backing *A* may be either of rubberized fabric or solid rubber of 80 durometer hardness. It is important that the device *B*, having the most extended surface, be made of the softest rubber; that the larger type *C*, having a lesser surface, be of a harder rubber than *B*; and that the smallest type lines *D* be of harder rubber than that used for either *B* or *C*.

In manufacturing this kind of printing plate strips of rubber are fitted into proper position in the matrix which, when vulcanized, will produce type corresponding in hardness to that desired for *B*, *C*, and *D* respectively.

If hard rubber backing be used, this sheet should be composite, comprising a body which will vulcanize to a much softer hardness, for example to 50 on the durometer scale. The reason for this condition is that the softer rubber has greater adhesive property and therefore vulcanizes more completely to the rubber constituting the type. The use of rubber softer than that of the backing for the character members of the plate, save those of smallest size, renders possible the general use of a backing rubber harder than that heretofore used. The diversity in hardness between large character members has, however, an advantageous effect even though the backing hardness be less than 80 durometer.

[7] U. S. patent No. 1,947,986, Feb. 20, 1934.
[8] U. S. patent No. 1,949,465, Mar. 6, 1934.

Fig 7. Composite Molded Printing Plate

A latex dipping method of forming rubber bands is disclosed as follows.[8] In carrying out the method a dipping tank *A*, Figure 8, is provided to contain the latex. The form *B* is preferably a solid cylinder with endless grooves *C* of the desired shape to form bands of the desired cross-section. The webs *D* between the grooves are comparatively sharp at their outer edges.

In carrying out the method the form, which may be previously heated to facilitate setting of the latex thereon, is dipped into the latex in one vertical position and withdrawn so as to apply a film of rubber thereto, the liquid rubber collecting in the grooves. The rubber thus deposited is dried, and the form may then be reversed and again dipped into the latex, withdrawn, and dried. Dippings may be made alternately with the form in opposite positions, or 2 or more dippings may be made with the form in one position, and 2 or more with the form in opposite position to the end that the rubber will be evenly distributed in the grooves *C* and to produce bands of the required thickness.

After the last dipping and drying operations the rubber deposited upon the forms may be vulcanized or, when vulcanized latex is used, may be further vulcanized, as by immersion in hot water or subjection to the action of low temperature steam.

When comparatively light bands are made, the film of rubber deposited over the sharp webs *D* may be so light as to permit separation of the bands by merely pulling them apart. When this condition is true, the tube of connected bands may be stripped from the form after vulcanization and sold in this condition, the consumer merely tearing a band off the tube as required.

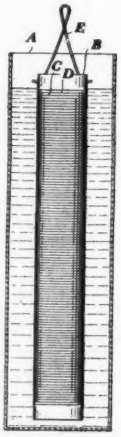


Fig. 8. Latex Dipping Tank

A stretchable fabric with suede finish for making shoe uppers is woven with the warp or weft or both wholly or partly of elastic threads consisting of textile-covered rubber cores so as to be stretchable in either one or both directions. The remaining parts of the shoe may be suede, leather, or fabric.[9]

[9] British patent No. 401,959, Apr. 5, 1933.

Slide Rule

THE circular slide rule here represented will appeal strongly to tire engineers, chemists, and rubber technologists and compounders because of its convenience and versatility as a calculator. It is adapted for solving all mathematical problems.

This slide rule is made of white enameled aluminum, 4 inches in diameter. The engine-divided scales are in black; so they are easy to read. An instruction book, "The Slide Rule Manual," is included with each rule, explaining the use of the rule in solving the simplest as well as many of the more complicated problems. Tavella Sales Co., 25 W. Broadway, New York, N. Y.

Rubber in the Foundry

IN THE process of preparing a core for odd-size pipe castings after the flanges are set, strips of sheet rubber of the same thickness as the casting to be made are wound around the core spirally from end to end inside the flange patterns.

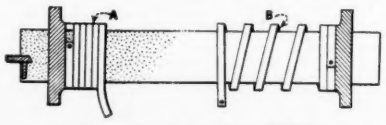
A in the illustration shows the rubber tightly wound as in the case of a casting of short length, thus forming a complete pattern; while *B* shows the strips spread out to effect a skeleton arrangement, the interstices being tightly packed with heap sand and scraped off level in accordance with skeleton pattern practice.

The rubber strips may be of any convenient length. A light nail driven into the core through a hole in each end of the strips holds them securely until their removal after the core-pattern is drawn from the sand. A resilient lagging of the kind will accommodate itself to any required diameter, and, with ordinary care, will last a lifetime. When the strips are not in use, they are hung on staples extending from the foundry wall; the various thicknesses are kept separate. The same practice applies to the metal flange rings, each size hung or piled separately, where they are ready for use at any time.

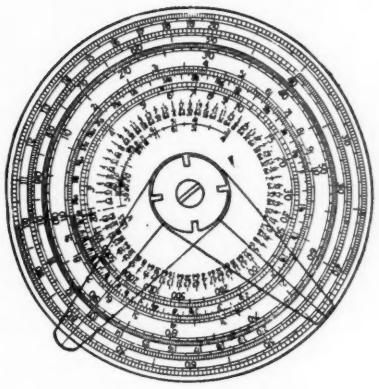
From this point the job becomes a matter of regular foundry routine. The pattern is bedded into a drag flask or pit, as size or circumstances determine, and the pipes are cast in green or dry sand molds, as size and other circumstances warrant. *Iron Age,* Apr. 19, 1934.

Air Coloring Unit

GOLF balls and many molded objects of rubber such as doll heads, fish lures, and similar articles are decorated or colored by hand brushing the color. This method naturally is slow and difficult to make uniform in large quantities. The air brush with dotting shield



Rubber Used in Core Making



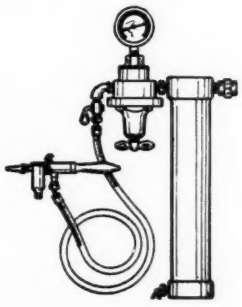
Midget 5-in-1 Rule

pictured insures sharp and regular outlines and saves time over hand brushing. Shields in a great variety of patterns are possible for any design to be reproduced and duplicated.

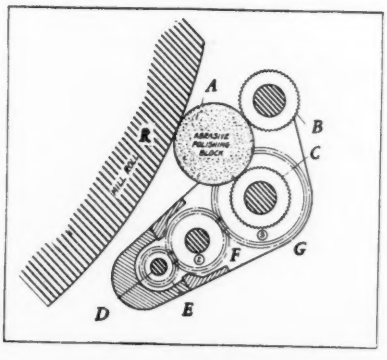
Air printing trade marks, symbols, and decorative effects on smooth or irregular surfaces gives uniformity in appearance, clear sharp edges, and saves time. Where several colors are used for the complete design, one shield for each color applied is required. Paasche Airbrush Co., 1909-23 Diversey Parkway, Chicago, Ill.

Automatic Roll Polisher

THE mechanism shown in the illustration, designed to polish rolls automatically for producing sheet metals, is well adapted for the same service on rubber calender rolls. The



Paasche Air Brush



Wahlert Roll Polisher

device consists of a pair of revolving, cylindrical abrasive polishing blocks, one for the top and one for the bottom roll.

As shown in the illustration the polishing block *A* is held and rotated by the chilled cast cleaner wheels *B* and *C*. Wheel *B* is an idler; while *C* is driven from the shaft *D* by the gears *E, F,* and *G*.

The polishing block rotation is in the same direction as the roll, but at a much slower speed, thus enabling the cleaning roll always to present a clean surface of the block *A* to the roll surface shown at *R* in the drawing.

The transverse movement of the polishing block is approximately one foot a minute and is automatically reversed from right to left. The Streine Tool & Mfg. Co., New Bremen, O.

Dulux Mill White

DULUX mill white is a newly developed factory paint said to be whiter than any other mill white finish. Higher original whiteness in the finish means that it reflects both natural and artificial light better; banishes dangerous shadows; aids in reducing eyestrain, fatigue, and consequent accidents to workers; helps speed up production; and eliminates waste and spoilage. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Instant Water Heater

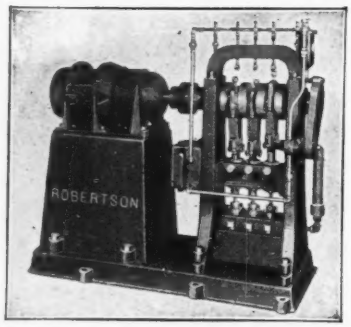
THE water heater shown herewith consists of concentric steam and water chambers with a copper spiral baffle in the outer water chamber. These chambers are so arranged that the cold water passes spirally through the central chamber the full length of the heater, surrounded by steam confined in the second chamber. The water then returns spirally in a thin sheet along the outside wall of the steam chamber, absorbing in its travel all possible latent heat of vaporization. This design develops internal velocity and turbulence and makes possible the exceptional capacity and efficiency of the apparatus.

The heating element is formed of 2 straight copper tubes of iron-pipe size, weight, and thickness. Besides having maximum heat conductivity copper resists corrosive action and retards the accumulation of scale; thus the heater retains its rated heat transfer capacity for a long period. The Johnson Corp., Three Rivers, Mich.

Vertical Triplex Pump

THE small capacity high pressure vertical triplex pump here illustrated is built in 3 sizes for pressures and capacities ranging from 1 to 5 gallons

Johnson Water Heater



Robertson High Pressure Triplex Pump

at 6,000 pounds per square inch pressure and from 2½ to 12½ gallons at 2,500 pounds hydraulic pressure, requiring 5, 15, and 20 h.p., direct-connected gear reducer motors, respectively, connected by flexible couplings directly to the pump shaft.

All shaft and eccentric bearings are bronze-lined, lubricated automatically by an oil pump which delivers the oil from a supply tank through an oil filter to the bronze guides of the solid forged steel pump chamber. A spring-balanced hydraulic safety valve completes the hydraulic end of this pump built for dependable service. John Robertson Co., Inc., 133 Water St., Brooklyn, N. Y.

Gasket-Type Pipe Coupling

POSITIVE seal pipe coupling is designed to permit joining of straight, plain-end pipe as it comes from the mill, without grooving, threading, beveling, or upsetting the ends. High strength in tension, effective sealing at pressures up to 4,000 pounds per square inch, and ease of assembly, even by unskilled labor, are claimed. Sizes for pipe ranging from 2 to 8 inches in diameter are made. Champion Machine & Forging Co., Cleveland, O.

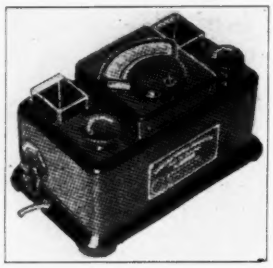
Latex Colorimeter

IN PREPARING microporous rubber according to Beckmann's method, it developed that not only different kinds of latex but also the same types, if obtained from different sources, displayed undesirable differences in quality. For characterizing the different types a photo-electric colorimeter gave the best results.

This instrument consists of a metal casing enclosing a 40-Watt opal lamp operated by any light current. On each side of the lamp 2 containers are so located that they are crossed by the rays of light which fall on 2 half-conductor photo-electric cells.

The cells are in compensated connection so that if absorption by the containers is equal, the indicator of the measuring instrument will stand at 0. If one of the vessels absorbs more light, then the measuring device shows a deviation corresponding to the concentration of the solution.

This colorimeter can be used not only to determine concentration of colored solutions, but also to measure turbidity. The coagulation of latex can also be measured by this device. Dr. B. Lange, Berlin-Dahlem, Germany.

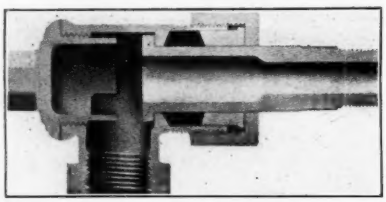


Lange's Colorimeter

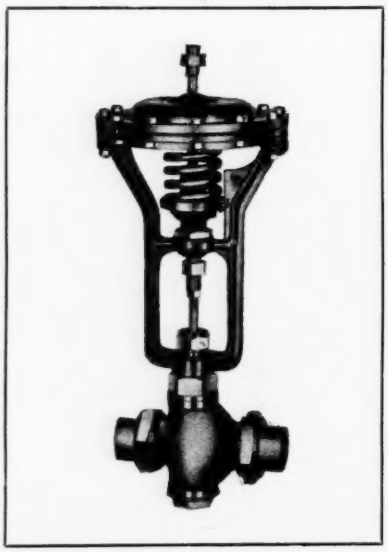
Swing Joints

MOLD cures are short in platen presses; therefore well-packed swing joints are essential to withstand leakages due to daily wear. Joints of various designs are available, using different packing materials.

The illustration shows in cross-section a swing joint that has been demonstrating its dependability for years in the plants of many rubber manufacturers. Its construction embodies special metallic packing which insures long wear, no blow-outs, and security against leakage for years of dependable service. The Bridgewater Machine Co., Akron, O.



Bridgewater Swing Joint



Bristol Synchro Valve

Synchro Valve

THE new Synchro diaphragm motor valve pictured is intended primarily for use on air operated control systems. The valve responds immediately to air pressure changes, and the stem position for a given pressure is the same whether pressures are rising or falling. There is no hysteresis or friction loss in the top movement. These features are accomplished by correct design of the rubber diaphragm and top, precision measurements in the manufacture and assembly of the stem guides, accurate alinement, and proper spring construction.

Union and valve bodies of either V-port or single seated construction are available with body material and trim to meet the demands of almost any industrial process. The Bristol Co., Waterbury, Conn.

Gum Stock Reel

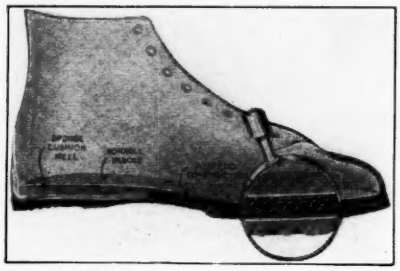
THE accompanying illustration represents a portable stock reel designed for storing and delivering calendered sheet rubber stock in rubber shoe plants. The reels and winding apron are made of vulcanized fiber.

The reel receives the stock at the calender where it is rolled into the fiber apron. It holds about 125 yards of stock and thus permits compact storage. The loaded reel is readily moved about and serves to supply a cutter with stock for a day's work at press or hand cutting table.

These reels economize much factory floor space, compared with the traditional stock frames, and facilitate labor by enabling each cutter to handle his own stock unaided. National Vulcanized Fibre Co., Wilmington, Del.

Portable Gum Stock Reel

New Goods and Specialties



Pat. Applied for

Air-Flo Insole

Tubular Rubber Insole

TINY rubber tubes now are utilized in an insole for athletic footwear for which many advantages are claimed. The Air-Flo Insole, as it is known, consists of dozens of small rubber tubes inserted between the Converse Korxole and a newly designed outsole. This new insole is said to permit complete circulation of air underfoot, thus assuring new coolness and foot comfort, and to add a degree of springiness and flexibility heretofore unknown. Converse Rubber Co., Malden, Mass.

Alundum Rubber Bonded Safety Treads

THIS Alundum rubber bonded safety tread is a wide departure from the old type of stair tread, principally because hard rubber provides an ideal material for the secure bondage of the open structured aluminum oxide abrasive in the wearing surface of this new product. Thus the wearing surface, even at the very nosing edge, offers the maximum of non-slipping protection and provides it in a permanent way, giving continuous, uniform, dependable protection for foot traffic. The tread is claimed not to wear smooth and slippery. As these treads have a flat, level surface, cause of tripping is eliminated. Furthermore they are not affected by weather conditions or water; consequently they are suited for outdoor as well as indoor use. The Alundum treads are easy to apply, on new or old stairs, on wood, steel, concrete, or stone.

The tread is composed of Alundum Aggregate, the non-slip element consisting of chips or granules of ceramically bonded Alundum abrasive (aluminum oxide) held together by a hard, glass-like, vitreous bond, securely molded into a reenforced base of rubber. The rubber is so vulcanized as to be hard and tough, yet sufficiently resilient to adapt itself to any slight unevenness in the surface to which it is applied. The tread comes in black, red, green, buff, and brown. The widths are 3¾, 6⅛, 7⅝, and 12⅛ inches, all running 6 feet 6 inches long with suitable screw attachment provisions. Many special sizes can be furnished when necessary, and treads can be drilled to meet special requirements. Norton Co., Worcester, Mass.

Rubber Hunting Knife

HUNTING knives of rubber, startlingly like the death-dealing originals, fill many needs, both for fun and practical purposes. This molded rubber model has a dark handle and steel colored, properly shaped and indented blade. Companion products are molded rubber daggers and hatchets. The

Molded Rubber Knife

Barr Rubber Products Co., Sandusky, O.

First All-Rubber Battery Separator

A BATTERY separator entirely of rubber, not affected by heat, cold, or acid, yet so porous it increases power flow, is announced by the Firestone Tire & Rubber Co., Akron, O., for its Extra Power type of battery. This new separator consists of millions of tiny rubber balls joined together to give both strength and porosity.

The importance of this discovery is shown by the fact that 90% of all battery failures are due to separator failure, for when the wood separators become charred and broken owing to heat and chemical action, they allow plates to touch so that the battery discharges internally. Extensive tests show the All-Rubber Separator is still intact and efficient after many miles and many months of service—far beyond the ordinary life of the battery.

It is interesting to note that the greater the power delivered to the starter the less the amperage consumed in starting the car so that the All-Rubber Separators enable the battery to hold its charge longer by starting the car quicker and conserving energy.

Wine Hose

THE production of wine in California was about 50,000,000 gallons annually before prohibition. Since repeal it is estimated that this production will be doubled in 1934. Practically every winery in the state has built additions and installed new cooperage and equipment. New wineries have been built; while old establishments have been overhauled. The rubber industry shares in the new business by the demand for high-quality wine hose.

Among the western companies competing successfully in the new business is The Universal Rubber Mfg. Co., San Francisco, Calif., which makes a very high-quality wine hose. Its construction, illustrated by a 1½-inch 5-ply sample, consists of high-quality white stock in both tube and cover, each ⅛-inch thick; heavy weight hose duck coated with strong black friction. The heavy cover is compounded to resist abrasive wear and like the tube contains nothing that will contaminate the fluids in contact with the hose.

Stairs Equipped with Rubber Bonded Safety Treads

Rubber Industry in America

OHIO

General Tire & Rubber Co., Akron. On June 21, 1,100 workers walked out and caused a complete suspension of operations.

Dayton Rubber Mfg. Co., Dayton, recently built tires of DuPrene, the synthetic rubber perfected by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. DuPrene has been found more resistant than natural rubber to the swelling action of gasoline, kerosene, and other solvents, and more resistant to the action of the air and to other chemicals that are destructive to natural rubber. It is resistant to oil and vulcanizes by the use of heat alone. At present, however, it is likely that the use of synthetic rubber in tires will be held in reserve as long as foreign supplies of native rubber remain undisturbed and the supply adequate.

The National Association of Purchasing Agents held its 19th annual international convention and Inform-a-Show at the Hotel Cleveland, Cleveland, June 18 to 21, inclusive. The opening address, "Industry's Problems and Program," was delivered by Paul W. Litchfield, president, Goodyear Tire & Rubber Co., Akron. June 18, George M. Tisdale, director of purchases, United States Rubber Co., 1790 Broadway, New York, N. Y., led the discussion on "Handicaps to the Purchasing Agent under the Codes." The presiding officer at the Tuesday morning session was Ralph D. Berry, purchasing agent, Davol Rubber Co., Providence, R. I.

Advertising Man

Philip C. Handerson, director of advertising and publicity for The B. F. Goodrich Rubber Co., Akron, O., was born on March 24, 1897. After graduating from Western Reserve University in 1919, he got a sound basic training in advertising with the McCann-Erickson Co., one of the largest agencies in the country, where he did a variety of advertising work for 2 years.

This experience landed him a job as advertising manager with the Cleveland Twist Drill Co. in 1921. In 1924 he went to the Griswold-Eshleman Co., later becoming secretary and treasurer. Eight years later, in 1931, he was selected for his present position with the Goodrich company.

Mr. Handerson lives at 963 Genesee Road, Akron, O. He is a member of Delta Tau Delta Fraternity, of the University Club, the Cleveland Chamber of Commerce, the Cleveland Advertising Club, and the Association of National Advertisers.

Ship Fenders of Rubber

Danger of damage either to ship or slip during docking has been greatly reduced by the use of a new type of rubber dock fender that absorbs the shocks of contacts which are unavoidable when warping a vessel into its slip.

This fender consists of sections of rugged rubber tubing, suspended over the sides of docks, and slips in with steel cables, which are run through the hollow tubes. Washers are attached to the lower ends so that the fenders can't fall off when used vertically.

The sections, usually installed in 10-foot lengths, have an outside diameter of 7 inches. The rubber of which they are made is of the same compound as that used in the tires of their manufacturer, the Goodyear Tire & Rubber Co., at Akron, O.

After a whole season of buffeting by docking ships, the fenders were found to show no effects of wear, and it was observed that they would revolve on their cables between ship and dock so that the usual chafing action was eliminated.

Goodyear Tire & Rubber Co., Akron. The company payroll, according to President Paul W. Litchfield, rose 90% during the first 5 months of 1934 as compared to the same period last year. At present the company has 19,000 employes as against 14,000 a year ago. Goodyear-Zeppelin Corp. late this month will begin the actual building of a Rail-Zeppelin for the New York, New Haven & Hartford Railroad Co. The contract calls for the new type, moderate weight, high-speed, 3-car articulated train. Dr. Karl Arnstein, vice president in charge of engineering, designer of 70 Zeppelins, spent 3 years perfecting the super-train, assisted by his staff.

The B. F. Goodrich Co., Akron. Herman Resseger, manager of mechanical goods time study, assisted by C. J. Phillips, R. H. Wattleworth, T. A. Rees, W. J. Glass, and G. L. Dirks, all Goodrich department heads, were on the program of The National Foremen's Association meeting in Wheeling, W. Va., June 16. Mr. Resseger's subject was "A Foreman's Responsibility in Organizing Work Before Time Study," and his associates demonstrated modern methods used by Goodrich. C. B. Raymond, Goodrich director, now a resident of Santa Barbara, Calif., was in Akron last month on a short business trip. New chemical line accessories, recently added to Goodrich products, were discussed at a Des Moines, Iowa, meeting of salesmen and retail managers in that territory. E. R. Bell, manager of the accessory sales department, Akron, presided.

Harvey S. Firestone, Sr., chairman of the board, Firestone Tire & Rubber Co., Akron, on June 18, received an honorary degree of Doctor of Laws from Kenyon College, Gambier, O.

FINANCIAL

Company Reports

Firestone Tire & Rubber Co., Akron, O. Six months ended April 30: net profits, after all charges, of $1,521,745, equal after dividend requirements on the preferred stock to 6¢ a share on the 1,970,849 shares of common stock. This compared with a net loss for the first 6 months of the preceding fiscal year of $1,575,917.

Lee Rubber & Tire Corp., Conshohocken, Pa., and subsidiaries. Six months ended April 30: net income after taxes, depreciation, interest, and other charges, $128,510, equal to 50¢ a share on 254,765, $5 par capital shares, contrasted with net loss of $195,159 in same period a year before.

Samson Corp., Los Angeles, Calif., (subsidiary of United States Rubber Co.), and subsidiaries. For 1933: net loss, $40,383.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Pfd.	$2.00 q.	July 2	June 16
Dominion Rubber Co., Ltd.	Pfd.	$1.75 q.	June 30	June 20
Dunlop Rubber Co., Ltd.	(Am. Dep. Rec.) for Ord. Reg.	$0.30⁹/₁₀	June 2	May 15
Faultless Rubber Co.	Com.	$0.50 q.	July 1	June 15
Firestone Tire & Rubber Co.	Com.	$0.10 q.	July 20	July 5
Fisk Rubber Corp.	$6 Pfd.	$1.50 q.	July 2	June 12
Garlock Packing Co.	Com.	$0.10 q.	July 2	June 23
Garlock Packing Co.	Com.	$0.10 ex.	July 2	June 23
General Tire & Rubber Co.	Pfd.	$1.50 q.	June 30	June 20
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$1.25 q.	July 3	June 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd.	$1.75 q.	July 3	June 15
Lee Rubber & Tire Corp.	Com.	$0.20	Aug. 1	July 16

OBITUARY

Fred M. Harpham

Goodyear Executive

AFTER an illness of several months Fred M. Harpham, well-known for his efforts to make Akron the center of lighter-than-air craft in the United States, died in the Rubber City on June 12. Since June, 1929, he had been a vice president of the Goodyear Tire & Rubber Co. and of the Goodyear-Zeppelin Corp. He had served on the board of the former since 1923 and of the latter since 1924. In 1930 he was one of the passengers, as a guest of Dr. Hugo Eckener, on the *Graf Zeppelin's* return trip to Germany.

Since he had always wanted to be a banker, Mr. Harpham, after his graduation from Central High School, Akron, went to work for a local bank. A short time later, however, upon the death of his father in 1895 young Harpham relinquished his position to carry on his parent's business of sheet metal and roofing.

A native Akronite, born March 7, 1875, Mr. Harpham was very active in civic affairs. He headed the local chamber of commerce and was instrumental in establishing its important Municipal Research Bureau. He was campaign manager of the Akron Better Federation and head of its budget committee. In 1917 he became vice chairman of the Akron Charter Revision Commission; in 1928 director of the Akron Community Fund Drive; and in 1929 president of the Akron Area Council Boy Scouts of America. He was also a director of the University of Akron and a member of the board of education. Besides Mr. Harpham belonged to the Masons, Rotary, Akron City, and Portage Country clubs, National Aeronautic Association, and Institute of Aeronautical Sciences.

Surviving are his mother, his widow, a daughter, 3 sisters, and a stepson.

Mandrel Manufacturer

SUDDENLY, on May 19, died Clyde E. Lowe, president of the Clyde E. Lowe Co., manufacturer of circular mandrels and tube molds, Cleveland, O., which he founded in 1918, after serving for some time as a sales representative for the Fitzsimmons Steel Co., Youngstown, O. The deceased was born in Bedford, O., 49 years ago.

Clyde E. Lowe

Funeral services were held May 22. Interment was in North Solon Cemetery.

Mr. Lowe leaves his widow, his son, 2 sisters, and 2 brothers, one of whom, Clifford, will continue the business with Clyde, Jr.

Veteran Reclaimer

HYMAN A. ROSENTHAL, owner of the Nearpara Rubber Co., manufacturer of reclaimed rubber, Trenton, N. J., and president of the Jefferson Warehouse Co., died June 14 at his home, 831 Berkeley Ave., Trenton, after a long illness. He was born in Vilna, Russia, in 1875 and attended public grade and high schools there. Upon graduating in 1892 he entered the employ of a wholesale grain dealer and remained there until he came to the United States in 1900.

From 1902 until 1912 he was in business as a wholesale scrap rubber merchant and from April, 1910, to April, 1911, was also vice president of the Harmer Rubber Reclaiming Works, East Millstone, N. J. Then in 1912 Mr. Rosenthal turned to manufacturing reclaimed rubber and continued until his death.

Mr. Rosenthal, who belonged to the Masonic order, is survived by his wife, 3 sons, 3 daughters, and a brother.

Burial was in the family plot in Trenton.

P. Raymond Wesley

Davol Official

P. RAYMOND WESLEY, general manager of the Davol Rubber Co., Providence, R. I., died at his home there on May 23. He had recently retired from business because of ill health. Mr. Wesley, who had entered the employ of Joseph Davol, founder of the Davol Rubber Co., in a private capacity in 1898, served successively in the pricing and purchasing departments, as assistant to the general manager, and manager of sales before being made general manager on October 1, 1919. For a while he also was on the executive committee of the Rubber Sundries Manufacturers Division of the Rubber Association of America.

Mr. Wesley was born in Columbia, Conn., September 3, 1871. He was graduated from Trinity College, Hartford, in 1894 with a B.S. For 3 years, while attending college, he worked for the *Hartford Telegram.* After graduation he became a buyer for a Providence department store. Then he joined the Davol organization.

He leaves his widow and a sister.

Old-Time Rubber Man

CARBON monoxide poisoning caused the death, on June 19, of Noyes E. Alling, retired banker and former head of the Alling Rubber Co., Hartford, Conn. He had been in ill health for several years.

After having been a traveling salesman for a rubber clothing manufacturer for several years Mr. Alling established a store, in September, 1890, in Norwich, Conn., for the sale of rubber goods generally. In 1895 he acquired and consolidated 2 rubber goods stores in Bridgeport, the business being conducted under the name The Alling Rubber Co., which flourished to include several branches in Connecticut and Massachusetts. He retired from the

firm some years ago. Besides Mr. Alling for a time was secretary-treasurer of a furniture and house furnishings company in Bridgeport.

He was born in Oxford, Conn., 71 years ago.

He is survived by 3 daughters and 3 brothers.

Alling Rubber Head

ON JUNE 4, Amos P. Mitchell, president and treasurer of the Alling Rubber Co., Hartford, Conn., died after having suffered a shock 7 weeks prior. Mr. Mitchell, who was born in Southbury, Conn., 63 years ago, early began his business with the late Noyes E. Alling in Bridgeport. Their efforts were successful, and a large chain of rubber stores was the result. When Mr. Alling retired some years ago, the deceased took over the business as a corporation, becoming treasurer and president.

Surviving are a son, 5 grandchildren, 2 sisters, and a brother.

The funeral was conducted on June 6. Burial was in Newtown Cemetery, Newtown.

NEW JERSEY

Most New Jersey rubber manufacturers, reporting improved business conditions, hope that plants will continue busy during the summer. Hard rubber production also shows an increase after a changeable season. The same situation prevails for rubber tiling.

The Rubber Manufacturers' Association of New Jersey held its annual outing June 19 at the Trenton Country Club. Many out-of-town members attended the event, which included a dinner and outdoor sports. John A. Lambert, of The Acme Rubber Mfg. Co., Trenton, is president of the association.

Puritan Rubber Mfg. Co., Trenton, has engaged additional workers, for it has received some large orders for rubber tiling. The company increased output 100% over that of early spring months.

Pierce-Roberts Rubber Co., Trenton, may have to dispense with one of its night shifts because production is slowing up.

Whitehead Bros. Rubber Co., Trenton, reports improved business.

Luzerne Rubber Co., Trenton, finds hard rubber production gaining.

Thermoid Co., Trenton, continues with 3 shifts of employes.

Essex Rubber Co., Trenton, remains busy in all departments, with prospects of a busy summer.

Acme Rubber Mfg. Co., Trenton, announces unchanged business.

Holland B. Slusser, vice president and treasurer, The Pocono Co., Trenton, has been on a lengthy business trip along the Pacific Coast.

(*Continued on page* 58)

NEW ENGLAND

Godfrey L. Cabot, Inc.'s general offices are now in the Columbian National Life Bldg., 77 Franklin St., Boston, Mass., where the entire top floor will be occupied. This move was necessary to accommodate a larger staff and increasing business. The laboratories will remain at 12 Lincoln St., Boston. Cabot recently struck a large oil well in Gilmer Co., W. Va.

The Fisk Tire Co., Inc., Chicopee Falls, Mass., has put Walter E. Riggot in charge of advertising, succeeding Howard C. Smith.

Hood Rubber Products Co., Watertown, Mass. Advertising Manager Paul N. Swaffield, advertising manager also of the B. F. Goodrich Footwear Corp., addressed the Advertising Club of Boston last month on "Choose Your Weapon." Alden C. Brett, also of the Hood company, Watertown, was elected president of the Boston chapter of the National Association of Cost Accountants at its annual meeting and outing at the Woodland Golf Club, Auburndale, Mass.

Bessie B. Loring, of the Boston Woven Hose & Rubber Co., Cambridge, Mass., was elected president of the Boston Chapter, National Institute of Credit, at a recent meeting at the Hotel Bradford, Boston, Mass.

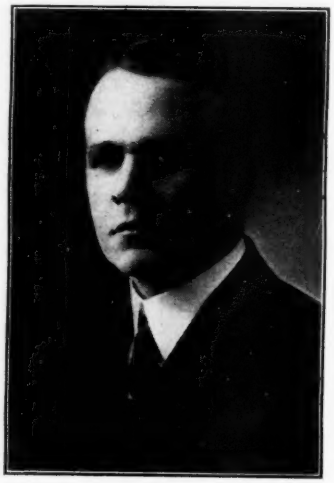
The New England Purchasing Agents Association, Inc., Boston, Mass., at the recent annual meeting elected Robert C. Kelley, Converse Rubber Co., Malden, Mass., vice president and an alternate national director. C. L. Sheldon, Hood Rubber Co., Watertown, Mass., is another director of the association. Among the new members admitted was William Robbie, Stedfast Rubber Co., Mattapan, Boston. Mr. Kelley also conducts a class in purchasing at Boston University.

The Rhode Island Rubber Group held a meeting on June 21 at the Pawtucket Golf Club, Pawtucket, R. I. The afternoon was devoted to a golf-kickers' handicap tournament. The dinner and meeting began at 7:30 p.m. The program consisted of a brief technical discussion by David C. Scott, Henry L. Scott Co., Providence; 2 papers: "The Manufacture of Golf Balls," by Mace Howell, and "The Testing of Golf Balls," by G. E. Long, both of the United States Rubber Co.; and a motion picture, "The Manufacture of Golf Balls."

Cambridge Rubber Co., 748 Main St., Cambridge, Mass., recently hired as chief chemist Charles Dennison, former chemist with the American Rubber Co., East Cambridge.

The Merrimac Waste Utilization Co., Lowell, Mass., manufactures flock for the trade. H. W. Roberts is manager.

Firestone Cotton Mills, Fall River, and New Bedford, both in Mass., increased wages 7½%.



H. P. Fuller

Pequanoc Sales Agent

The latest addition to the sales force of the Pequanoc Rubber Co., manufacturer of reclaimed rubber, Butler, N. J., is Harold Perry Fuller, New England district sales agent, with offices at 844 Park Square Bldg., Boston, Mass.—and a wise choice Pequanoc made as Mr. Fuller's whole business career has been devoted to reclaimed rubber. For a quarter century he was associated with the E. H. Clapp Rubber Co., Hanover, Mass., principally as salesman and manager of sales of its reclaiming department. Then for 4 years he served as vice president of E. H. Clapp Rubber Products Co.

Mr. Fuller was also quite active in the affairs of The Rubber Club of America, forerunner of The Rubber Manufacturers Association, Inc., having been assistant secretary of the club in 1912, secretary and director in 1913.

"Ipanaman," the First Human Robot to Talk, Smile, and Gesticulate—Its Sponge Rubber Head Resembles Fred Allen, the Radio Star

EASTERN AND SOUTHERN

Rubber Code News

Rainwear Budget and Label Regulations

The National Recovery Administration has received from the divisional code authority for the rubber manufacturing industry (Rainwear Division), applications for approval of its proposed budget of expenses and regulations pertaining to the issuance of NRA labels.

The total amount of the proposed budget is $56,278.14, including $46,050 estimated to cover expenses for the fiscal year beginning April 1, 1934. The basis of contribution by members of the industry is a charge of $10 per thousand for approved NRA labels, estimated to yield the sum of $60,000 yearly.

Mechanical Goods Hearing

A public hearing on the application by the divisional authority for the mechanical rubber goods division of the rubber manufacturing industry, for approval of group customer classification definitions and maximum terms of sale, was held last month in Washington, D. C. Eleven types of customers were listed by the industry. They are distributer, jobber and mill supply house, mail order house, dealer, chain store, department store, syndicate buyer, equipment manufacturer, industrials, government, and consumer.

Tire Sales Warranty

National Recovery Administrator Hugh S. Johnson announced June 14 a further, indefinite stay of a provision in his order of May 3 requiring members of the retail rubber tire and battery trade to give no guarantee or warranty in the sale of tires or tubes except against defects in material or workmanship for a period of 90 days from the date of sale.

Trade Practice Complaints Committee for Tire Manufacturing Industry

The National Recovery Administration on June 15 announced that trade practice complaints under the code would be handled by the following special committee: chairman, A. L. Viles, The Rubber Manufacturers Association, Inc., New York, N. Y.; I. Eisbrouch, McClaren Rubber Co., Charlotte, N. C.; R. S. Wilson, Goodyear Tire & Rubber Co., Akron, O.; L. H. Jackson, Firestone Tire & Rubber Co., Akron; C. Borland, Mohawk Rubber Co., Akron; and J. W. Whitehead, Norwalk Tire & Rubber Co., Norwalk, Conn. The committee will handle trade practice complaints for a period of 60 days, except those dealing with labor provisions of the code.

Rubber Code Hearing

The Phillips-Baker Rubber Co., Hartford, Conn., the LaCrosse Rubber Mills Co., LaCrosse, Wis., and the Goodyear Rubber Co., Middletown, Conn., failed to file prices with the code authority of the rubber manufacturing industry. The NRA asked the Federal Trade Commission to cite the companies which at once filed a counter-complaint.

The Federal Trade Commission decided to order the rubber companies before it in order to permit full investigation of all issues raised both in the complaint of the NRA, and the appeal of the companies.

The chief counsel of the commission was instructed to prepare the complaint and to submit it to the commission for approval as to form prior to service.

Jersey Tire Code Ruling

Vice Chancellor John H. Backes, of New Jersey, dismissed the complaint of State authorities, who charged Sears, Roebuck & Co. with selling tires at about $1 less than the price set in the State code, which the company said did not take precedence over the Federal code.

The court ruled in' dismissing the complaint that "this is a national recovery and not merely a New Jersey recovery, and the Governor—or rather his appointed agents—overstepped their bounds when they established prices higher than those approved by the President."

Col. J. Lester Eisner, administrator of the New Jersey state recovery act, declared he has ordered all state codes to be amended, where necessary, to bring them into complete conformity with national codes. The code authority for the rubber tire trade in New Jersey asserted, in its statement, that it had determined not to adopt the national low prices at this time.

The Barrett Co., 40 Rector St., New York, N. Y., manufacturer of chemicals for the rubber industry, has appointed Alfred L. Loebenberg vice president and assistant to the president. Mr. Loebenberg for many years was with leading chemical companies, having held many responsible positions. Frank S. Harkins, former assistant director of advertising with the United States Rubber Co., 1790 Broadway, New York, also has joined the Barrett organization.

Vulcanized Rubber Co., Morrisville, Pa. President S. H. Renton is taking a 2-month vacation to tour the principal European cities. Comptroller Hugh Ross, seriously injured June 16 in an automobile accident, was confined for a time at Mercer Hospital, Trenton.

Smith Chemical & Color Co., Inc., 55 John St., Brooklyn, N. Y., announces the appointment of J. Robert Smith to its sales and executive forces. He will represent the company in the eastern and southern states.

U. S. Rubber Notes

H. N. Hawkes, general sales manager, tire division, United States Rubber Co., has announced the transfer of A. K. Dill from the general offices of the company, 1790 Broadway, New York, N. Y., to the Detroit, Mich., plant. In addition to his present duties in charge of bicycle tire, accessories, and repair material sales, Mr. Dill will represent the general sales department in contacting and working with the development and manufacturing departments on product.

H. O. Bock, former head of the truck and bus tire department, New York, was named district tire sales manager at Chicago, Ill.

The general sales office of the golf ball department of United States Rubber Products, Inc., Providence, R. I., was moved to 1790 Broadway, New York. E. C. Conlin is sales manager of the department. Associated with him in New York are John W. Sproul and George T. McCarthy.

In recognition of Eddie Rickenbacker's contribution to automotive progress U. S. Rubber chose the twenty-fifth anniversary of the Indianapolis Motor Speedway, of which Captain Rickenbacker is president, to give him an historic silver, gold, and copper plaque, believed the first trophy ever offered in connection with the famous racing classic. W. B. Harding, president U. S. Tire Co., made the presentation.

George B. Patterson, works manager, Hardie Rubber Co., Ltd., Sydney, Australia, was in the United States last month on business for his firm.

The Kelly-Springfield Tire Co., 395 Lexington Ave., New York, N. Y., has named H. B. Soulen factory manager of the plant at Cumberland, Md. President William H. Lalley has been granted an indefinite leave of absence because of ill health and sailed recently for Europe, it is reported.

Martin Rubber Co., Inc., Long Island City, N. Y., according to President Walter L. Tepper recently installed a water cooling system costing $3,000. The firm expects actual gains from this system through a saving on the high water tax and also because of the improved quality of its products.

Carlisle Tire & Rubber Co., Carlisle, Pa., according to President Charles S. Moomy, has engaged his son Richard E. L., formerly with the Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., as assistant to the general superintendent.

Bell Rubber Co., Inc., Dallas, Tex., manufactures parts and accessories for oil field equipment. Ivan C. Bell is president; Mrs. Ivan C. Bell, vice president; and L. G. Highnote, secretary-treasurer.

EDITOR'S BOOK TABLE

Book Reviews

"Chemical Engineers' Handbook." Prepared by a staff of specialists. John H. Perry, Ph.D., editor-in-chief; W. S. Calcott, assistant editor. First Edition, Second Impression. McGraw-Hill Book Co., Inc., New York, N. Y., and London, England, 1934. Bound in Fabrikoid. 2,609 pages, 5 by 7¼ inches. Thumb indexed. Price $9.

This volume is designed as a reference work for both practicing engineers and students. It covers every phase of the industry in 30 principal divisions, written by specialists recognized as authorities, aided with the advice and suggestions of 150 chemists and engineers. Each of the 30 principal sections has its own table of contents and is readily found by numbered thumb tabs corresponding to the index of sections. The work is a marvel of completeness, accuracy, and convenience. It will long remain the standard in its field.

"The Chemistry of Petroleum Derivatives." By Carleton Ellis. The Chemical Catalog Co., Inc., 330 W. 42nd St., New York, N. Y. 1934. Cloth, 1285 pages, 6 by 9 inches. Illustrations, graphs. Name and subject indices. Price $18.

This comprehensive compilation on the utilization of petroleum as a manufacturing source of hydrocarbon products is one of great value and importance to research chemists and represents years of labor on the part of the author and many other chemists eminent in scientific research. The chapters on "The Carbon Black Industry. Deposition of Carbon from Flames" and "Polymerization of Monolefins and Diolefins. Production of Synthetic Rubber" are of particular interest to rubber chemists and rubber technologists.

"Chimie et Technologie du Latex de Caoutchouc." By George Genin. Published by *La Revue Generale du Caoutchouc*, 18 Rue Duphot, Paris, France. Paper covers, 392 pages, 6¼ by 9½ inches. Illustrated. Preface by Emile Fleurent, member of the Academy of Agriculture.

The important place that latex now occupies in the rubber industry has made it necessary for those interested to have as complete and recent data as possible on its various technical and chemical developments. M. Genin has prepared a book, more particularly for Frenchmen who have hitherto lacked such a work in their own language, presenting a clear, comprehensive, and up-to-date survey of latex chemistry and technology.

The author has drawn freely on patents and numerous periodicals, INDIA RUBBER WORLD being frequently mentioned. The work consists of 2 parts: a scientific section devoted to the history of the question, methods of collecting latex, composition and properties of latex, coagulating and preparing rubber, and preservation, shipping, and concentration of latex. The second part, purely technical, surveys the methods of preparing rubber compounds, vulcanization of rubber, dipped goods processes, impregnating fabrics, electrical deposition, and, finally, a review of the various applications of rubber latex.

New Publications

"Data Sheets on Calcene." The Columbia Alkali Corp., Barberton, O. This is the second in a series of data sheets on Calcene and is designed to show the compounder of stocks for insulated wire the possibilities of Calcene for improving the physical properties and low volume cost of such stocks.

"The Story of Tire Treading." James C. Heintz & Co., 3738-46 W. 143rd St., Cleveland, O. This extensively illustrated booklet contains a comprehensive discussion of full circle treading and an illustrated description of an especially designed full circle retreading machine and the accessory equipment.

"H-P-M High Pressure Hydraulic Presses." Catalog 120 A1. The Hydraulic Press Mfg. Co., Mount Gilead, O. This catalog describes the general line of presses manufactured by the company for industrial purposes, including the modern way of production pressing sheet metal, etc., into finished shapes.

"Rubber Cements." Letter Circular LC411. United States Department of Commerce, Bureau of Standards, Washington, D. C. This paper covers the subject of rubber cements comprehensively, including ingredients, kinds of cements, their uses, production, and the commercial sources of the materials.

"Rubber Position and Prospects." F. R. Henderson, 25 S. William St., New York, N. Y. This short survey of the commercial status of rubber is based on consideration of world stocks, production, consumption, prices, and the 5-year plan of restriction of output. The opinion is advanced that "With the present outlook for general business recovery, both in this country and abroad, rubber indeed invites consideration from an investment standpoint at today's level of prices."

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The May-June, 1934, issue contains a well-considered article on "Modern Compounding Ingredients for Rubber" followed by 16 full-page articles each on a compounding specialty of the Vanderbilt company.

"Solux. Laboratory Report No. 173." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The characteristics and technical advantages of this non-discoloring antioxidant and preventive of fatigue deterioration of rubber are described and exemplified in the test data reported. Solux is said to be substantially equal to the best of the standard discoloring types of antioxidant for resisting flex cracking and fatigue deterioration.

"How to Select Insulated Cable." General Electric Co., Schenectady, N. Y. This is a new 80-page reference book covering cable for the transmission and distribution of electric power at normal frequencies and presents in convenient form the information required in determining the cable best adapted for a particular installation. The book should be useful to cable engineers, electrical engineers of industrial plants, consulting engineers, architects, contractors, and college professors.

"Type 'CH' All Metal Cloth Screen Dust Collector." Bulletin No. 197. Pangborn Corp., Hagerstown, Md. This bulletin contains data and illustrations covering the many exclusive features not previously available in this class of equipment. The elimination of dust in the air of compounding, mixing, and other departments of a rubber plant is a matter of practical economy that merits more consideration than it ordinarily receives.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for May, 1934:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

	May, 1934	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	10,698	267
United States	37,613	937
Continent of Europe	11,057	433
British possessions	1,888	21
Japan	5,834	20
Other countries	632	3
Totals	67,722	1,681

Rubber Imports: Actual, by Land and Sea

	May, 1934	
From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	1,933	15,567
Dutch Borneo	1,284	10,006
Java and other Dutch islands	1,045	302
Sarawak	1,842	50
British Borneo	470	61
Burma	339	27
Siam	547	450
French Indo-China	29	31
Other countries	97	13
Totals	7,586	26,507

Rubber Industry in Europe

GREAT BRITAIN

Restriction Opinions

Views of the press and individuals regarding the new restriction scheme continue to be favorable, although the Dutch and other quotas are criticized.

The *Financial Times* finds the scheme "eminently statesmanlike and soundly-conceived. An essential condition of success is that virtually all sources of supply should be included. In this case, no important plantation area has been omitted. Production in 1933 from the territories not included was barely 13,000 tons, whereas the potential productions for 1934 of the assenting areas, forming the basis of the export quotas, aggregate 1,019,000 tons. Even if the outturn of the excluded regions were not almost negligible, authoritative opinion is that the producers there would only be tempted to important enlargement of their output by prices much higher than are contemplated by the parties to the new agreement."

"The scheme devised appears to meet all the criticisms that such a plan must incur," finds the *Daily Telegraph.*

But the *Manchester Guardian* is uneasy: "Anyone who looks back on the history of the Stevenson Scheme and studies . . . the difficulties of operating a restriction scheme, will find considerable misgivings whether the present . . . control is likely to work out to the ultimate benefit of the industry. . . .

". . . raising prices to producers has severe limitations, even if it did not involve most intricate administrative problems and a degree of control over native producers that has not hitherto been secured."

The Dutch East Indies has been very favorably treated, is the opinion of the *Financial News.*

"If we regard the potential Dutch East Indies estate production as having a full quota, the assessment means that allowance is made for native production . . . equivalent to about ½ of the potential maximum. With rubber at any reasonable price, this seems quite sufficiently generous. And, unless the price goes up quite quickly, the D.E.I. estates may well be more favorably placed than the Malayan estates."

At the recent general meeting of the Dunlop Rubber Co., Sir Eric Geddes also touched on quotas, although his criticism was leveled mainly at those of Indo-China, Sarawak, and Siam. "Such departures from the main principle," he said, referring to the quotas, "may have been necessary to secure general assent . . . but they destroy the equity of the scheme . . . formidable competitors are given an advantage over us as manufacturer-producers, through operating in areas which are either not restricted at all or only partially restricted." He further stated his opinion that manufacturers should have been given representation on the International Regulating Committee.

The *Rubber Age* of London also makes the point that consumers' interests are inadequately represented. " . . . the proposals," it says, "while making a profession of willingness to accept advice from . . . 'representatives of rubber manufacturers in Europe and America,' has signally failed to provide the machinery whereby a comprehensive expression of the views of consumers as a body can be transmitted. . . . The rubber manufacturers of this country should be invited to elect a committee . . . authorized to speak for the whole trade on . . . present and prospective requirements of the raw material, and as to how prices were affecting public demand for certain commodities or obstructing the development of new lines. . . . A similar committee could be set up in America, and in each of the countries which are large consumers."

In conclusion, H. Eric Miller's admonition to the rubber industry is well worth quoting. Speaking at a meeting of the Pataling Rubber Estates, Ltd., he said: "In the administration of a scheme of regulation the best will in the world cannot obviate certain relative injustices in the actual application of it, and I would appeal to everyone who may feel aggrieved to take the broadminded view of his case and to give full weight to the benefits in which he is sharing."

Company News

Dunlop Rubber Co., Ltd., reports net profits of £1,512,866, which is an increase of £652,789 over the preceding year. A dividend of 8% was declared on ordinary stock. A record output was produced last year and despite tariff and exchange difficulties the company's position abroad has been improved. Dunlopillo cushioning is finding increasing use in theaters, public buildings, railways, busses, etc. Improved prospects in British South Africa have led to the decision to build a factory near Durban to manufacture tires and certain general goods.

Zinc stearate is said to have been successfully used to dust ribbed smoked sheets to prevent sticking together. A 3-ton shipment was recently received here in perfect condition, the sheets of rubber separating easily. The zinc stearate is also said to prevent adhesion to the rubber of splinters and dust; while the small amount of the powder remaining on the sheets is serviceable to the manufacturer rather than otherwise. The extra cost entailed by its use appears to be negligible and the method is recommended for smaller mills.

The Reliance Rubber Co. makes hot water bottles embossed with 5 rules regarding their correct use.

Germany

In connection with the foreign currency situation, the Government has announced the creation of a Control Bureau for Crude Rubber with offices in Hamburg, the purpose of which is to watch over crude rubber imports and to insure the most favorable means of supplying the requirements of the rubber industry. Not only crude rubber, but gutta percha, balata, reclaimed and waste rubber, etc., are also included.

The rubber industry has been expecting something of the kind since similar offices have already been established for controlling imports of raw textile materials, hides and skins, etc. So far there has been no intimation that crude rubber imports are to be curtailed, but the increased imports during the current year suggest that the rubber industry here may be preparing itself for such a contingency. In the first quarter of 1934, 187,888 quintals of crude rubber were imported, against 138,213 quintals during the corresponding period of 1933; for the first 4 months of 1934 the figure is 257,839 quintals, almost half the total for 1933 and more than 50% the first 4 months of 1933.

At the same time it is worth noting that last year crude rubber imports constituted a record, having topped even those for 1929 and a gain of over 100,000 quintals when compared with 1932. Considering the low figures of exports and imports of manufactured rubber goods, it may be argued that the huge crude imports are required for a greatly increased home demand. Certainly home sales are more active, and tire manufacturers must be feeling the stimulus of the motorization program of the government. However it is more likely that the size of the crude imports is due to a desire of manufacturers to cover themselves in the expectation of a further rise in crude prices on the one hand, and of government restriction of imports on the other, than that the revival of business

in Germany is so great as to necessitate such notably increased purchases of raw material.

The interest of the whole situation hinges on the fact that Germany is attempting to use her position as consumer of raw materials to improve her export business and has decided that the proportion of crude materials she will import from producer countries is to be measured by the amount of goods these countries buy from her. To gain her end she is prepared to fall back on substitutes.

The rise in crude rubber prices has led to an increase in the price of various mechanical rubber goods, ranging from 5 to 11%.

At the meeting of the Deutsche Kautschuk Gesellschaft at Cologne, May 27 to 29, the following papers were among those read: "Scientific Investigation of Rubber," H. Staudinger; "Recent Findings in Connection with Ozone Decomposition of Natural and Butadiene—Sodium Rubber," R. Pummerer; "On the Properties of Rubber Coagulum and the Rubber Films Made Thereof," A. van Rossem; "Rubber as Raw Material," Fr. Evers; "Rubber Butadiene-Sodium Rubber," R. Pumber as Electrical Insulating Material," Th. Wasserburger; "New Accelerators," St. Reiner; and "Use of Glue in Hard and Soft Rubber Mixes," P. Kluckow.

The well-known German manufacturers of elastic goods, Julius Rompler A.G., Zeulenroda, has established a branch in Vienna, Austria. The founder of the original firm may also be regarded as the father of the German elastic goods industry. In 1870 he went to England, where the production of knitted elastic goods was started in 1833, and which at the time of his visit was the sole exporter of these goods. The following year he returned to Germany and opened up the first factory at Erfurt. The present firm has secured rights of exclusive import of latex thread from America.

The Rubber Control Bureau has issued an order effective June 1, 1934, by which cycle tires are made in prescribed sizes only and in 2 qualities. The crude rubber that may be used ranges from 160 to 350 grams per tire, depending on quality and type; inner tubes for ordinary tires are allotted 75 grams per tube, and for balloon and transport tires, 100 grams. All cycle tires must be uniformly black and inner tubes, gray.

Tires made in accordance with the new order must bear no mark to distinguish them from those hitherto manufactured. By June 1, 1934, all manufacturers should have given the Control Bureau a complete list of their stocks of tires as hitherto manufactured, classified according to size, brands, and colors. After June 4, 1934, and until further notice delivery of these tires is prohibited though this prohibition may be modified as soon as a survey of the previously made tires has become possible.

U.S.S.R. Rubber Industry

Latest reports amply illustrate the difficulties of the Soviet's plans for large-scale cultivation of native rubber-bearing plants. The rubber trust has established 11 rubber-producing groups in Kazakstan, Central Asia, Ukraine, Northern Caucasus, Department of Moscow, and Central Crimea where plantations chiefly of Tau Sagiz and also Kok Sagiz, and Krim Sagiz, have been established. According to the program of the second 5-Year Plan, 570,000 hectares are to be planted up by 1937, the whole capable of yielding 440 kilos of pure rubber per hectare, or a total of 65,000 tons. However little progress towards this goal seems to have been made so far. Thus 85,000 shrubs per hectare were to have been planted, but 12,000 per hectare appear in Turkestan and only 400 per hectare in Maikop, Northern Caucasus. Again while in 1932, 7,000 hectares of additional land were to have been planted to Tau Sagiz, actually only 56 hectares were planted. According to latest available figures, the total area under Tau Sagiz in 1933 was 1,546 hectares; Kok Sagiz 858 hectares; and Krim Sagiz, 103 hectares. The poor results were due to the inferior seeds supplied, insufficient experience of growing conditions, and ignorance of methods of combating parasites.

Side by side with attempts at developing home sources of crude rubber, elaborate experiments with synthetic rubber have been carried out. Three important plants for producing synthetic rubber on a large scale have already been established, with capacity ranging from 5,000 to 10,000 tons each, and 3 more plants are being built. Professor Lebedev's process appears to be the one finding actual practical application, and pneumatic tires with a mileage up to 27,000 kilometers, it is claimed, have been made with this material. In the process in question ethyl alcohol, obtained from corn waste and a kind of potato, is the base. This is passed over a catalyst, for instance a mixture of aluminum and zinc oxide, yielding butadiene. After isolation the butadiene is polymerized by means of metallic sodium. The rubber thus obtained is said to be elastic within much wider limits of temperature than natural rubber, and like the latter, can be reclaimed. Experiments are now under way to substitute ethylene and acetylene for the alcohol.

European Notes

Some increase is noted in the quantities of certain rubber manufactures exported from France during 1933 as compared with 1932, but on the whole there was a marked decline in values. Thus the most important article, tires, came to 90,280 quintals, value 138,839,000 francs, in 1933 against 88,693 quintals, value 154,740,000 francs, in 1932. Cycle tires were 16,176 quintals, value 21,570,000 francs, against 19,970 quintals, value 29,679,000 francs; apparel of rubberized fabric, 1,359 quintals, value 5,601,000 francs, against 1,158 quintals, value 6,132,000 francs; elastic fabrics, 1,127 quintals, value 6,704,000 francs, against 1,079 quintals, value 6,751,000 ffancs. Other goods were 20,881 quintals, value 22,376,000 francs, against 19,160 quintals, value 23,779,000 francs. Footwear exports, however, totaled 6,291 quintals, value 8,440,000 francs, against 5,382 quintals, value 7,774,000 francs.

Business for the Dansk Galoche-og Gummifabrik, Copenhagen, Denmark, improved to such an extent last year that a considerable profit was reported and a dividend distributed although in the preceding year the balance had closed with a loss of around 650,000 kroner. This state of affairs is the result of the reorganization of the firm and the extension of operations to include the manufacture of a number of new articles. The factories have been well occupied, and the number of employes was doubled as compared with 1932. Prospects for the current year are said to be good.

Reports have it that the Pirelli Co. of Milan, Italy, plans to erect works for the manufacture of Captax and cupromanganite; in addition the subsidiary firm, S. Italo-Americana Filo Elastico Pirelli-Revere, is to build a factory to make latex thread. Pirelli further has the right to manufacture upholstery of foam rubber and of animal hair dipped in latex. In a recent report the concern stated it has considerably increased the sale of pneumatic tires both in Italy and abroad.

The firm of Franceso Mora & Amilcare Scandolara, Milan, Italy, will manufacture rubber printing plates.

Hakuenka

The modern compounding ingredient Hakuenka is not simply a "filler," but a material of unique properties and possibilities of practical importance in rubber work. For example, its covering power is not great; therefore added colors are never changed or faded in a rubber mixing. Thus especially beautiful colors, unique in value and luster, are possible by combinations of Hakuenka and dyestuffs.

A MACHINIST HAD MADE SOME ADJUSTments on an embossing machine. The machine was stopped as well as the motor which drives it, and he intimated to another employe who was with him that the machine was okay. The other employe, apparently thinking that the machinist was in the clear, closed the switch which started the motor and the machine. At the time the machine started the machinist's right second finger was under the plunger which stacks ankle patches, resulting in the finger being amputated at the first joint. This accident was charged with 150 days lost. *Rubber Section, National Safety Council.*

Rubber Industry in Far East

Malaya

Restriction Opinions

The restriction scheme might have been worse, thinks the *Straits Times,* and this attitude seems to reflect the feeling of most people here. The *Times* has hitherto agitated against control, but has now apparently changed its policy and urges all concerned to give restriction a fair chance.

The Times of Malaya considers the scheme basically sound, but insists that a pivotal price of around 9d. is essential to prevent prices running away. It says:

We have only to take the case of tin control for an example of what happens without a pivotal price. Some 18 months ago those guiding the destinies of the tin scheme stated that they would be satisfied if they could but raise the price to £150. Today the price is nearer the £250 mark and certain sections are even talking of making tin a semi-precious metal at £300, thus further alienating the sympathy of consumers and encouraging the development of uneconomic areas.

Whatever leading papers may think, individual opinion among certain planters is not so favorable. Several letters to the press state Malaya was never consulted about the present scheme. Others, doubtful of Dutch good faith, suspiciously ask whether the Dutch can control native planting. Says one writer:

Again the restriction of planting will, in practice, only apply to Malaya. The D.E.I. may pass legislation to prevent the "natives" planting, but there is not the least doubt that the "natives" will plant up, and to cut the trees down at the end of 5 years will cause bloodshed and a revolution. The Dutch will say, we did our best but could not help it, we could not supervise the interior. . . .

In my opinion there should be no move made in Malaya until the D.E.I. have shown how they can control the natives both in regard to production, including stocks and to new plantings. Unless this is done there is not the least doubt that Malaya will be outwitted by the Dutch as usual.

Practically the same stand is taken by another who winds up: "Unless the D.E.I. natives are prevented from expanding their rubber, Malaya will be ruined by the present scheme."

Rubber Research

Among the articles in the *Journal of the Rubber Research Institute of Malaya* for March, 1934, is one on "Yield Performance of Budded Trees of Proved Clones in Commercial Practice," by C. E. T. Mann. He states that maximum yields obtained in test tapping are not likely to be obtained in practice; still yields of 450 pounds per acre in the sixth year to at least 1,500 pounds per acre at maturity are probable.

In his "Observations on the Completion of the Union in Buddings of *Hevea Brasiliensis* Made on Larger Stocks," C. C. T. Sharp says that the angle of the cut of the pruned surface of the stock affects the rate of healing. He recommends a fairly steep angle for large stocks and that surfaces be allowed to heal over naturally with no treatment other than partial shading from the sun.

Contamination with iron discolors latex, Edgar Rhodes and K. C. Sekar find in their "Causes of Discoloration in Preserved Latex." Wooden barrels and brand-new kerosene tins are better than steel drums. The latter, if used, should have a suitable protective coating inside.

Japan

That Japan continues to be an important supplier of various rubber articles to the United States is indicated by official statistics for March, 1934. By far the greater part of rubber balls imported into the United States in March came from Japan: 180,184 out of a total 200,044. Japan also supplied practically all the rubber toys, including toy balloons, $20,595 out of a total $20,774; all the friction tape, 11,379 pounds, value $1,415; erasers, 10,645 pounds, value, $794; tennis balls, 1,080, value $90; and other rubber goods, $20,771 out of a total $35,710.

Japan's foreign trade in bicycles, chiefly to Eastern countries, is increasing by leaps and by bounds, and with this naturally cycle tires and tubes. In January, 1933, cycles, value 747,260 yen, were exported and by December this figure had increased to 1,376,031 yen. Two years ago the monthly average had only been around 300,000 yen. The cycles are sold at unbelievable prices, and in Batavia some brands can be obtained for as little as 7.50 guilders each. Incidentally the Netherlands East Indies is Japan's best customer for these cycles and last year took 50% of the total exported.

The cheap canvas and rubber shoes from Japan that have caused so much anxiety to manufacturers everywhere are very popular in East Africa. They are in fact proving a boon to the native population of Tanganiyika where, it is reported, these shoes have done more to protect the people from hook-worm disease than all the work that has been performed by the local health department.

Netherlands East Indies

Restriction News

In the N.E.I. the restriction scheme has been approved by a large section of the planting community, but the *Algemeen Landbouwweekblad* seems to think that the feeling of the conqueror contemplating his fallen foe is too much in evidence, the victor here being the producer, and the vanquished, the big consumer, particularly American. It therefore urges producers to moderate their transports, to cooperate with consumers, to be satisfied with a modest profit, and above all not to attempt to screw prices up too high, recalling that consumers have many weapons to fall back on in case of need. They could produce more rubber substitute, guayule, and reclaim; Hevea plantations in Africa and South America could be extended; and rubber could be extracted from a variety of wild plants if necessary; while, finally, synthetic rubber has advanced considerably since the Stevenson Scheme, for instance, DuPrene.

In the People's Council, Batavia, however, the scheme was not so well received, and for a time it looked as though it would be rejected altogether. The proposed special export duty on native rubber was vigorously opposed and finally defeated; individual licensing of native growers was voted for instead. Nor did the regulations, allocating the export quotas in the proportion of 71 to 100 for native and estate rubber respectively, fare any better. In the end the ratio had to be changed to 100 to 100. Latest reports state that the exportable amount for native rubber has been fixed at 47,183,000 kilos of dry rubber for the period June 1 to September 30, 1934, inclusive.

The Central Bureau of Statistics announced that 7,419 tons of rubber were exported from Java and Madeira during April, 1934, and 37,282 tons from the Outer Possessions. In April, 1933, the amounts were 5,130 and 14,126 tons respectively.

Siam

Siam's favored position as a rubber producer under the new restriction scheme has centered more than usual attention on this country. Its inclusion in the scheme was recommended some time ago, not so much on account of its actual or potential output as that it was too convenient for smugglers.

Siam's rubber growing industry may be said to date back to the beginning of the present century. Rubber seeds had been brought back from Java as a curiosity for the gardens of the king,

according to a recent letter in the *Times of Malaya*, and the successful growth of these seeds in Siam soil suggested to Europeans the possibilities of local rubber estates. Before long the first rubber plantation under European management was started in Siam, and others soon followed. Later on Chinese, coming into the country over the Malayan border, planted up many thousands of acres.

By 1925-26, Siam exported 4,955 tons and by 1929-30, 5,581 tons; however, the slump that followed closed many plantations so that in 1932-33 the exports were only 3,407. Shipments during the past year, again stimulated by better prices, rose to over 7,000 tons. Under the control scheme Siam is allotted a basic annual quota of 15,000 tons over the 5 years the scheme is to run, and the minimum exportable amount for 1934 is to be not less than 50% of this. For each of the next 4 years the amount is to be not less than 75%, 85%, 90%, and 100% respectively.

Ceylon

Restriction Quotas

The rubber restriction scheme was warmly welcomed here, and satisfaction was expressed over Ceylon's basic quota, for the current year 77,500 tons. On this basis the exportable allowance for the period June 1 to December 31, 1934, inclusive, has been fixed at 39,400 tons. Since exports in the preceding 5 months of 1934 have been about 35,000 tons, the total that may be shipped from Ceylon in the current year is around 75,000 tons. If the level of exports during the first part of the year could have been maintained, the total shipments that could have been expected from Ceylon during 1934 would have been well over 60,000 tons, the record reached in 1929. Ceylon's potential output is put at 90,000 tons, and taking this into consideration, the permissible exports for 1934 show a fair reduction.

But how effective in curtailing exports a period of low prices can be is abundantly proved by the figures for 1930 and succeeding years. In 1930 exports had already dropped to 75,594 tons from the 1929 high; in 1931, 61,575 tons; and in 1932, 49,478 tons; last year improved conditions raised the total to 63,770 tons.

Despite the generous treatment Ceylon has received, there are reports of attempts to get around the provisions of the Control Bill formulated there. A number of persons are said to have transferred rubber stumps of 4 years and older from nurseries to small plots of land during the last week or so, with the idea that the trees so transplanted may be counted by the assessors as rubber producing trees of 4 years and over. The need of revision of the Control Bill in its present form, to prevent such evasion of the spirit of the scheme, is therefore to be submitted before the proper authorities.

NEW JERSEY

(*Continued from page 52*)

Jos. Stokes Rubber Co., Trenton, reports that business shows a decided improvement both at the Trenton and the Welland, Ont., Canada, plants. Paul E. Gunkel, general manager of the Canadian plant, has been visiting in New Jersey, having recently recovered from a serious illness.

Prominent Executive

The life of William Henry Sayen, Jr., president of the Mercer Rubber Co., Hamilton Square, N. J., may well serve as an example of the successful business man to be emulated by Young America. Our hero (if he will pardon us the possession) was born in Wayne, Pa., on January 21, 1883. He was graduated from Haverford School in 1901 and from Princeton University with the Litt.B. degree in 1905. He was vice president of his graduating class.

Then young Sayen joined the Mercer Rubber Co., maker of mechanicals, which his father, William Henry Sayen, Sr., had founded in the late years of the Nineteenth Century. Bill or Henry, as he is known to his friends, started as a salesman, but soon won rapid promotions, not because he was the boss's son, but because of his inherent ability and business acumen. He was the company treasurer when his father, the Mercer president, died in 1921. What more natural than that this son who was so engrossed in the business should succeed to the presidency? He did.

Mr. Sayen is active also in the civic life of his community. He was on the Borough Council at Princeton from 1912 to 1920, foreman of the Mercer County Grand Jury 3 years ago, president of the Princeton Chamber of Commerce in 1921, and secretary of the Rubber Manufacturers' Association of New Jersey for several years. Like every intelligent business man leading a well-balanced life, this executive has other outside interests. He belongs to the Masonic Order, Union League Club of Philadelphia, and the Ivy and Nassau clubs of Princeton.

Mr. Sayen was married in 1910 and through all these years has been a loving husband and father. He lives with his family in Princeton.

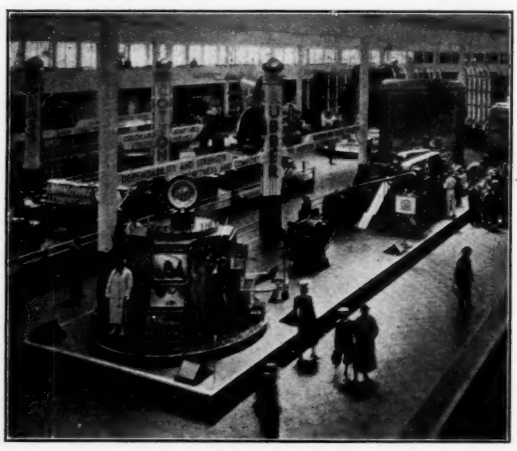
(He is very modest, this man, and the following information did not come from him; we found it while searching through our files for data to supplement the scanty biographical details he volunteered. Mr. Sayen, a Y.M.C.A. worker during the World War, was constantly under bombardment during his stay overseas. In 1919 Marshal Petain, of France, conferred upon him for extreme bravery while under fire the Croix de Guerre.)

MIDWEST

The National Tire Dealers' Association in convention at Chicago, Ill., June 11, 12 and 13 advocated the establishment of an emergency in the retail battery industry and the official preparation of floor levels of prices for all grades of batteries. Talks on codes and general industrial subjects were made by W. O'Neil, president, General Tire & Rubber Co., Akron, and J. A. MacMillan, president, Dayton Rubber Mfg. Co., Dayton, both in O.

The organization changed its name to the National Tire & Battery Association. George J. Erlinger, of New York, was elected president, succeeding Martin J. Barry, of Baltimore. Other new officers include: A. B. Chapman, Los Angeles, vice president; and M. G. Byrne, Chicago, secretary-treasurer. Norval P. Trimborn, chairman of the retail tire and battery code authority, was again selected as general manager of the retail organization.

Mogul Rubber Corp., Goshen, Ind., manufactures pump valves, tubing, gaskets, washers, and molded specialties of all kinds, the latter mostly from customers' molds. The firm is also equipped to make molds for rubber production. Company officers include B. A. Ruhling, president; G. W. Kehres, vice president; and W. J. Mast, secretary-treasurer.



United States Rubber Co.'s Exhibit at A Century of Progress for 1934, Chicago, Ill.

Patents and Trade Marks

MACHINERY

United States

1,956,016. **Electric Tire Numbering Disk.** A. C. Flothow, assignor to Everhot Mfg. Co., both of Maywood, Ill.

1,956,050. **Inner Tube Apparatus.** R. W. Snyder, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,956,109. **Sheet Rubber Article Patcher.** W. E. Turner, Yakima, Wash.

1,956,131. **Tire Shaper and Airbag Inserter.** G. B. Nichols, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,956,293. **Liquid Dispersion Apparatus.** P. Klein, Budapest, Hungary, and A. Szegvári, Akron, O., assignors to American Anode, Inc., Akron, O.

1,956,330. **Tuber Head.** A. B. Mullin, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,956,331. **Tire Buffer.** A. B. Mullin, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,956,429. **Slitter.** F. B. Toothaker, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,956,577. **Temperature or Pressure Controller.** L. C. Irwin, assignor to Charles J. Tagliabue Mfg. Co., both of Brooklyn, N. Y.

1,956,719. **Strainer.** E. H. Johnson, assignor to Farrel-Birmingham Co., Inc., both of Ansonia, Conn.

1,956,720. **Strainer.** W. A. Gordon, Shelton, assignor to Farrel-Birmingham Co., Inc., Ansonia, both in Conn.

1,956,982. **Forming Bead Flippers.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.

1,957,270. **Talcing Apparatus.** A. W. Keen, Passaic, H. T. Battin, Ridgewood, and P. C. Dutton, Nutley, all in N. J., assignors to Revere Rubber Co., Providence, R. I.

1,957,518. **Sheet Rubber Backer.** H. J. Woock, assignor to Super Mold Corp., both of Lodi, Calif.

1,957,981. **Tire Builder.** F. J. Shook, Akron, O., assignor to National-Standard Co., Niles, Mich.

1,958,069. **Transmission Belt Apparatus.** S. Sadler, Birmingham, England, assignor, by mesne assignments, to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

1,958,072. **Molds.** L. B. Sebrell, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,958,092. **Strip Rubber Article Apparatus.** A. B. Merrill, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,118. **Aqueous Dispersion Homogenizer.** A. Szegvári, assignor, by mesne assignments, to American Anode, Inc., both of Akron, O.

1,958,122. **Trimmer.** R. R. Ambler, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,128. **Machine Safety Device.** M. S. Cate, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,132. **Binding Trimmer.** H. L. Davis, Walpole, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,137. **Strip Cutter.** F. D. Fowler, Newton, assignor to Hood Rubber Co., Inc., Watertown, both in Mass.

1,958,138. **Strip Cutter.** F. D. Fowler, Newton, and H. L. Davis, Walpole, assignors to Hood Rubber Co., Inc., Watertown, all in Mass.

1,958,141. **Flexible Connection Mold.** F. L. Haushalter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,422. **Plastic Material Mold.** R. W. Dinzl, Philadelphia, Pa., assignor to General Motors Corp., Detroit, Mich.

Dominion of Canada

341,117. **Tire Bead.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. O. Abbott, Jr., Grosse Point Park, Mich., U. S. A.

341,492. **Rubber Filament Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Hazell, New York, N. Y., U. S. A.

341,671. **Thread Tester.** Dunlop Rubber Co., Ltd., London, assignee of R. F. Lee and A. R. Bloxham, co-inventors, both of Birmingham, all in England.

United Kingdom

403,688. **Electric Conductor Apparatus.** F. H. M. Bennett, Purley.

404,110. **Tire Vulcanizing Press.** Dunlop Rubber Co., Ltd., London, and T. Norcross, Birmingham.

404,194. **Rubber Thread Apparatus.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

404,219. **Rubber Thread Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of J. R. Gammeter, Akron, O., U. S. A.

404,446. **Boot Imitation Crease Former.** Etablissements Hutchinson, Paris, France.

404,460. **Tire Builder.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

404,486. **Tire Tread Strip Apparatus.** B. F. Goodrich Co., New York, N. Y., assignee of T. B. Farrington, Pasadena, Calif., both in the U. S. A.

404,704. **Rubber Thread Apparatus.** Revere Rubber Co., Providence, R. I., assignee of A. W. Keen, Passaic, N. J., both in the U. S. A.

405,313. **Textile Impregnating Device.** J. E. C. Bongrand, Paris, and L. S. M. Lejeune, Nord, both in France.

PROCESS

United States

19,155 (Reissue). **Rubber Coated Article.** B. Dales, Chadds Ford, Pa., assignor to B. F. Goodrich Co., New York, N. Y.

1,955,840. **Rubber - Coating Fabric Gloves.** G. W. Trobridge, Sutton Coldfield, assignor to Dunlop Rubber Co, Ltd., Birmingham, both in England.

1,955,950. **Immersing Growing Fruit in Latex.** L. G. Copeman, assignor to Copeman Laboratories Co., both of Flint, Mich.

1,956,012. **Receptacle Closure.** C. H. Egan, Belmont, assignor to Dewey & Almy Chemical Co., Cambridge, both in Mass.

1,956,053. **Rubber - Bonded Asbestos Product.** G. R. Tucker, N. Andover, assignor to Dewey & Almy Chemical Co., N. Cambridge, both in Mass.

1,956,156. **Porous Rubber Product.** E. W. Madge and A. N. Ward, both of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

1,956,287. **Bag.** P. H. Henkel, assignor to Continental Rubber Works, both of Erie, Pa.

1,956,533. **Inflatable Rubber Article.** L. Kelemen, deceased, by J. Kelemen, widow and sole inheritrix, and Z. Keleti, assignors to Magyar Ruggyantaárugyár Részvénytársaság, all of Budapest, Hungary.

1,956,722. **Rubberizing Tubing.** J. A. Kennedy, Pawtucket, R. I., assignor to Anaconda Wire & Cable Co., New York, N. Y.

1,956,727. **Wearing Apparel.** H. W. O'Neill, Berlin, assignor to Stanley Chemical Co., E. Berlin, both in Conn.

1,957,298. **Treating Scorched Rubber Compounds.** M. G. Shepard and E. R. Burns, both of Waterbury, Conn., assignors, by mesne assignments, to Dispersions Process, Inc., New York, N. Y.

1,957,732. **Floor Covering.** W. Rowe, Philadelphia, Pa., assignor, by mesne assignments, to Sloane-Blabon Corp., New York, N. Y.

1,958,110. **Drying Rubber.** E. B. Newton, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,116. **Brake Lining.** J. H. Simpson, Jr., Philadelphia, Pa., and A. B. Merrill, Akron, O., assignors of ½ to J. Sullivan & Sons Mfg. Co., Philadelphia, Pa., and ½ to B. F. Goodrich Co., New York, N. Y.

1,958,131. **Weather Stripping.** E. E. Davidson, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,455. **Joining Flexible Sheet Material.** H. M. Ware, S. Croydon, England.

1,958,803. **Combustion and Heat Transferring Unit.** P. H. Segnitz, Milwaukee, Wis., assignor to Shaler Co., Wilmington, Del.

1,958,976. **Impregnated Sheet Product.** G. A. Richter, assignor to Brown Co., both of Berlin, N. H.

1,959,021. **Rubber Goods.** B. Dales, Fairlawn, assignor, by mesne assignments, to American Anode, Inc., Akron, both in O.

Dominion of Canada

341,020. **Tire Tube.** J. C. Carlin, Norristown, Pa., U. S. A.

341,441. **Sole.** W. F. Schacht, Huntington, Ind., U. S. A.

341,493. **Crinkled Elastic Material.**

Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. J. Galligan and W. J. Robinson, co-inventors, both of Providence, R. I., U. S. A.

341,509. **Shoe.** Littleway Process Co., Boston, Mass., U. S. A., assignee of United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of G. Goddu, Winchester, Mass., U. S. A.

341,615. **Golf Ball.** J. V. Pugh, Meriden, England.

United Kingdom

404,003. **Molding Coverings on Propellers.** British Thomson-Houston Co., Ltd., London, and R. I. Martin and G. R. R. Bray, both of Rugby.

405,284. **Proofing Permeable Material.** E. V. Hayes-Gratze, London.

Germany

597,429. **Latex Objects.** E. Nottebohm, Hamburg, and H. Roth, Konstanz.

597,465. **Balls of Porous Rubber.** Societe Belge du Caoutchouc Mousse, Brussels, Belgium. Represented by T. v. Laczay, Berlin.

597,584. **Threads or Bands.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth and C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.

597,601. **Radio-active Rubber Thread for Garments and Bandages.** Julius Rompler A.G., Zeulenroda. [Addition patent No. 552,774.]

597,900. **Golf Balls.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

CHEMICAL

United States

1,956,543. **Rubber Emulsion.** L. Kirschbraun, Leonia, N. J., assignor, by mesne assignments, to Patent & Licensing Corp., New York, N. Y.

1,956,899. **Adhesive.** J. Goldmann, assignor to A. Levy, both of Strasbourg, France.

1,956,965. **Golf Ball Varnish.** S. I. Strickhouser, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,957,301. **Coating Composition.** M. C. Teague, Jackson Heights, and N. H. Brewster, Brooklyn, both in N. Y., assignors to Naugatuck Chemical Co., Naugatuck, Conn.

1,957,314. **Carbon Black.** E. Billings, Weston, and H. H. Offutt, Winchester, assignors to Godfrey L. Cabot, Inc., Boston, all in Mass.

1,957,368 and 1,957,369. **Latex Composition.** J. H. Swan, 3d, assignor to Gardner-Richardson Co., both of Middletown, O.

1,957,370. **Latex Composition.** C. A. Thomas, Dayton, and J. H. Swan, 3d, Middletown, assignors to Gardner-Richardson Co., Middletown, all in O.

1,957,437. **Factice.** L. Auer, Budapest, Hungary, assignor to J. R. Newman, Washington, D. C., as trustee.

1,957,786. **Chlorinated Rubber Composition.** W. Koch, assignor to Hercules Powder Co., both of Wilmington, Del.

1,958,311. **Lithographic Ink Composition.** J. V. Mehl, Union City, N. J.

1,958,469. **Antioxidant.** L. J. Christmann, Jersey City, and C. J. Romieux, Elizabeth, both in N. J., assignors to American Cyanamid Co., New York, N. Y.

1,958,479. **Adhesive.** E. Hazell, New York, N. Y., and H. F. Stowe, Rutherford, N. J., assignors to Naugatuck Chemical Co., Naugatuck, Conn.

1,958,745. **Rubber Composition.** H. A. Endres, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,958,770. **Accelerator.** L. B. Sebrell, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,958,821. **Artificial Leather.** K. Haarburger, Reutlingen, Germany.

1,958,860. **Wetting Agent.** O. A. Pickett, assignor to Hercules Powder Co., both of Wilmington, Del.

1,958,924. **Accelerator.** W. A. Moore, assignor to Rubber Service Laboratories Co., both of Akron, O.

1,958,928. **Age Resister.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,958,929. **Age Resister.** R. L. Sibley, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,959,110. **Age Resister.** W. Scott, Akron, O., and H. G. Byers, New York, N. Y., assignors to Rubber Service Laboratories Co., Akron, O.

1,959,160. **Microporous Rubber.** H. W. Greenup, assignor to Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

341,268. **Artificial Leather.** Brown Co., assignee of M. O. Schur, both of Berlin, N. H., U. S. A.

341,316. **Coating Composition.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. A. Murphy and D. N. Simmons, co-inventors, both of Birmingham, England.

341,383. **Auto Top Material.** E. T. Croasdale, Bridgeport, and R. Morgan, Fairfield, co-inventors, both in Conn., U. S. A.

United Kingdom

403,698. **Bonding Composition.** Carborundum Co., Ltd., Manchester.

404,027. **Rubber Composition.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.

404,120. **Subjecting Articles to Ultra-Violet Light.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

404,260. **Coating Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

404,665. **Granular Composition.** Dunlop Rubber Co., Ltd., London; Anode Rubber Co., Ltd., St Peter's Port, Channel Islands; E. A. Murphy, Birmingham; and A. B. Hatton, Manchester.

404,691. **Fire Resistant Coating.** St. Helens Cable & Rubber Co., Ltd., Slough, and H. C. Harrison, Maidenhead.

405,247 and 405,263. **Coated Fabric.** Minnesota Mining & Mfg. Co., assignee of R. G. Drew, both of St. Paul, Minn., U. S. A.

405,296. **Latex Adhesive.** Boston Blacking Co., Ltd., Leicester, assignee of W. H. Wedger, Belmont, Mass., U. S. A.

405,315. **Latex Marking Ink.** Imperial Chemical Industries, Ltd., London, and L. P. Rendell and G. E. Scharff, both of Manchester.

405,345. **Latex Adhesive.** Boston Blacking Co., Ltd., Leicester, assignee of W. H. Wedger, Belmont, Mass., U. S. A.

405,391. **Rubber Composition.** W. W. Plowman and W. Feldenheimer, both of London.

405,483. **Rubber Marking Ink.** E. Lovinsohn, M. Schnelling, and H. Lovinsohn, (trading as Dr. Lovinsohn & Co.), all of Berlin, Germany.

405,797. **Antioxidant.** B. F. Goodrich Co., New York, N. Y., assignee of W. L. Semon, Silver Lake, O., both in the U. S. A.

Germany

597,467. **Working Up Super-Vulcanizates Derived from Solutions.** Artifex Chemische Fabrik G.m.b.H., Altona-Stellingen.

597,843. **Improving Vulcanizates' Wear Resistance.** Hessische Gummiwarenfabrik Fritz Peter A.G., Kleinauheim b. Hanau a. M.

GENERAL

United States

19,152 (Reissue). **Dish Scraper.** C. A. Schacht, Huntington, Ind.

1,954,153. **Tire Pressure Indicator.** P. E. Taylor, Memphis, Tenn.

1,954,190. **Yieldable Driving Connection.** J. C. Zeder, assignor to Chrysler Corp., both of Detroit, Mich.

1,954,214. **Tire.** J. V. Martin, Garden City, N. Y.

1,954,219. **Rubber Cement Coated Article Preservation.** H. E. Moyses, New York, N. Y.

1,954,243. **Vase.** F. Huttenlocher, Des Moines, Iowa.

1,954,264. **Clothes Wringer Feeding Device.** M. A. Ross, Des Moines, Iowa.

1,954,276 and 1,954,277. **Cushioning Means.** O. U. Zerk, Cleveland, O.

1,954,412. **Shower Ring.** M. H. Hollingsworth, Miami Beach, Fla.

1,954,422. **Cap Applier and Remover.** J. D. McIntyre, Roslindale, Mass.

1,954,448. **Inlaid Toilet Seat.** F. B. Hackett, assignor to Brunswick-Balke-Collender Co., both of Chicago, Ill.

1,954,458. **Furniture Glide.** E. W. North, assignor to National Lock Co., both of Rockford, Ill.

1,954,505. **Pneumatic Tire.** J. Truppe and C. Buhlman, both of Brooklyn, N. Y.

1,954,724. **Flexible Hose.** S. H. Collom, assignor to Pennsylvania Flexible Metallic Tubing Co., both of Philadelphia, Pa.

1,954,738. **Golf Ball Washer.** F. C. Lerch, Benton Harbor, Mich.

1,954,899. **Horseshoe.** G. Thuillier, Domaine de Montrouan par Gibles, France.

1,954,934. **Elastic Hinge Joint.** M. Houdaille and C. Lecler, both of Levallois-Perret, France.

1,954,937. **Internal Combustion Engine.** T. J. Litle, Jr., Indianapolis, Ind., assignor to Packard Motor Car Co., Detroit, Mich.

1,954,940. **Massaging and Washing Device.** C. S. Mikel, assignor of ½ to F. B. Morse, both of Rochester, N. Y.

1,954,952. **Fountain Pen.** E. S. Sears, Thornton Heath, assignor to Mabie, Todd & Co., Ltd., London, both in England.

1,955,008. **Rubber Bag.** H. H. McGee,

New York, N. Y., assignor to Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn.

1,955,024. **Cable.** A. Rohs, Kladno, Czechoslovakia, assignor to Felten & Guilleaume Carlswerk A. G., Cologne-Mulheim, Germany.

1,955,053. **Life Saving Device.** E. I. Carlbeck, Chicago, Ill.

1,955,066. **Postal Machine Stripper and Feeder.** G. Hiller, Inglewood, assignor to National Postal Meter Co., Los Angeles, both in Calif.

1,955,069. **Pipe Coupling and Joint.** C. W. Hunt, Los Angeles, Calif., assignor, by mesne assignments, to Johnson-March Corp., Long Island City, N. Y.

1,955,073. **Article Holder.** A. Kessler, Brooklyn, N. Y.

1,955,099. **Pipe.** F. H. Silverthorne, New York, N. Y.

1,955,190. **Wringer.** W. L. Kauffman, 2d, assignor to Lovell Mfg. Co., both of Erie, Pa.

1,955,231. **Portable Shower Spray.** J. M. Frederick, assignor of ½ to J. L. Rosenfield, both of Baltimore, Md.

1,955,306. **Foundation Garment.** L. Malmstead, Worcester, Mass.

1,955,420. **Tire Patch.** J. G. Hall, Richmond, Va.

1,955,425. **Sweat Band.** W. F. Jones and P. R. Hawley, both of Upper Darby, Pa.

1,955,442. **Dampening Roller.** P. Schwartz, assignor to Rapid Roller Co., both of Chicago, Ill.

1,955,444 and 1,955,445. **Mop Wringer.** A. Wenger, Bayonne, N. J.

1,955,453. **Weather Pad Construction.** A. P. Fletcher, Huntington Woods, and F. E. Beems, Dearborn, assignors to Ford Motor Co., Dearborn, all in Mich.

1,955,523. **Brassiere.** G. M. P. Yerkes, Hartsdale, assignor to G. M. Poix, Inc., New York, both in N. Y.

1,955,660. **Wash Suit Attachment.** M. Tartikoff, Brooklyn, N. Y.

1,955,692. **Cable.** E. R. Thomas, Palisades Park, N. J.

1,955,711. **Pneumatic Tire.** L. C. Mills, Chicago, Ill.

1,955,747. **Tobacco Pipe.** B. A. Johnston, New York, N. Y.

1,955,751. **Track for Tracklaying Vehicles.** H. A. Knox, Davenport, Iowa, and T. H. Nixon, United States Army, Gettysburg, Pa.

1,955,830, 1,955,831, and 1,955,832. **Connecter.** F. J. Raybould, Erie, Pa.

1,955,841. **Spring Shackle.** W. A. Tryon, Elmira, N. Y.

1,955,853. **Liquid Separator.** L. L. Lawson, Renton, and P. Sand, Seattle, both in Wash.

1,955,868. **Railway Car Door.** W. E. Wine, Toledo, O.

1,955,892. **Artificial Leather.** M. O. Schur, assignor to Brown Co., both of Berlin, N. H.

1,955,900. **Toy Cap Pistol.** W. R. Bixler, Kenton, O.

1,955,984. **Artificial Board.** C. J. Strobel, Port Huron, assignor to St. Clair Rubber Co., Detroit, both in Mich.

1,956,011. **Tire Traction and Noise Diminisher.** R. D. Evans, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,956,015. **Vibration Dampener.** W. S. Fisher, assignor to Willys-Overland Co., both of Toledo, O.

1,956,018, 1,956,019, and 1,956,020. **Electric Safety Plug.** C. E. Gilbert, New York, N. Y., assignor to Gilbert & Hertz, Inc., a corporation of N. Y.

1,956,045. **Fibrous Web for Impregnating.** G. A. Richter, assignor to Brown Co., both of Berlin, N. H.

1,956,108. **Spring and Absorption Means.** T. H. Symington and P. R. Drenning, assignors to T. H. Symington & Son, Inc., all of Baltimore, Md.

1,956,146. **Container.** H. H. Burton, Leicester, England.

1,956,179. **Artificial Leather.** M. O. Schur, assignor to Brown Co., both of Berlin, N. H.

1,956,195. **Cushion Car Wheel.** W. C. Klein, Allentown, Pa.

1,956,273. **Electric Lamp Holder.** C. L. Cleburne, London, England.

1,956,276. **Hoof Moistener.** W. H. Cook, Athens, N. Y.

1,956,347. **Wringer Roller.** P. P. Gearhart and A. B. Mullin, assignors to Firestone Tire & Rubber Co., all of Akron, O.

1,956,457. **Garment Cutting Line Printer.** P. Violante, Naples, Italy.

1,956,472. **Endless Chain.** O. S. Penn, Upper Bourne End, assignor to Roadless Traction, Ltd., Middlesex, both in England.

1,956,545. **Vulcanizer Presser Belt.** E. Schrader, Hanover, H. Windhorn, Hanover-Buchholz, and H. Meyer, Hanover-Kleefeld, all in Germany.

1,956,555. **Hermetically Sealed Jar Closure.** R. H. Barnard, Toledo, O., assignor to Vacuum Seal Co., Inc., New York, N. Y.

1,956,578. **Tire Deflation Indicator Switch.** C. W. Johnston, Newark, N. J.

1,956,579. **Adhesive Tape.** E. L. Kallander, Framingham, and R. F. Charles, Concord, assignors to Dennison Mfg. Co., Framingham, all in Mass.

1,956,692. **Pipe Joint and Packing Ring.** J. R. McWane, assignor to McWane Cast Iron Pipe Co., both of Birmingham, Ala.

1,956,694. **Well Packer.** B. E. Parrish, Cody, Wyo.

1,956,695. **Flat Furuncle Plaster.** E. Reinitz, Vienna, Austria.

1,956,721. **Insulated Electrical Conductor.** J. A. Kennedy, Pawtucket, R. I., assignor to Anaconda Wire & Cable Co., New York, N. Y.

1,956,739. **Tire Cooler.** R. Gollert, Berlin-Charlottenburg, Germany.

1,956,813. **Garment.** V. L. Stephenson, assignor to Snuggle Rug Co., both of Goshen, Ind.

1,957,072. **6-Wheel Vehicle Spring Suspension.** A. F. Masury, assignor to International Motor Co., both of New York, N. Y.

1,957,218. **Motor Mounting.** R. K. Lee, Highland Park, assignor to Chrysler Corp., Detroit, both in Mich.

1,957,263. **Receptacle Protector.** L. B. Gray, Kansas City, Mo.

1,957,377. **Article Retainer.** A. J. Whittle, Chicago, Ill.

1,957,384. **Tire.** C. G. J. Briquet and A. E. Dmitrieff, both of Vilvorde, Belgium.

1,957,487. **Multicore Cable.** O. E. Buckley, Maplewood, N. J., and F. S. Malm, Nordenham, Germany, assignors to Bell Telephone Laboratories, Inc., New York, N. Y.

1,957,778. **Separable Plug.** A. F. Hopkins, Jr., Duluth, Minn.

1,957,866. **Stub Type Valve Stem.** F. H. Watson, Jonesboro, assignor to F. H. Watson Co., Little Rock, both in Ark.

1,957,956. **Portable Shower.** C. Hardy and L. Bady, both of New York, N. Y.

1,957,969. **Nipple.** J. Little, Warwick, assignor to Davol Rubber Co., Providence, both in R. I.

1,958,011. **Pipe Packing.** W. D. Moore, assignor to American Cast Iron Pipe Co., both of Birmingham, Ala.

1,958,090. **Shoe.** L. H. L'Hollier, Waltham, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,107. **Footwear Appliance.** A. B. Merrill and C. A. Ritchie, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

1,958,119. **Outboard Motor.** P. R. Tarr, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,958,125. **Hose Coupling.** H. A. Bourne and C. C. Cadden, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

1,958,135. **Shoe.** H. E. Dunbar and M. P. Bringardner, assignors to International Shoe Co., all of St. Louis, Mo.

1,958,139. **Sprocket Chain.** J. R. Gammeter, Akron, O.

1,958,466. **Container Closure.** A. B. Boyd, Lansdowne, Pa.

1,958,490. **Draft and Buffing Mechanism.** W. H. Mussey, Chicago, Ill., assignor, by mesne assignments, to Pullman Car & Mfg. Corp., a corporation of Del.

1,958,642. **Railway Vehicle Wheel.** R. H. Rosenberg, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

1,958,668. **Electric Iron Handle.** A. T. Lark, Detroit, Mich.

1,958,687. **Shielded Cable.** L. C. Wolcott, Warren, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.

1,958,796. **Pen Flashlight with Light Focuser.** N. A. Mercer, New York, N. Y.

1,958,811. **Douche Nozzle.** O. F. Boehme, Reading, Pa.

1,958,892. **Amusement Device.** C. W. Hill, Los Angeles, Calif.

1,959,037. **Vehicle Wing or Mudguard.** A. W. Ray, Leigh-on-Sea, England.

1,959,050. **Orthopedic Appliance.** V. L. Closson, Kansas City, assignor to Walk-Easy Foot Rest Mfg. Co., St. Louis, both in Mo.

1,959,254. **Cushioning Element.** O. U. Zerk, Chicago, Ill.

1,959,256. **Cushioning Element.** O. U. Zerk, Cleveland, O.

1,959,257. **Hinge Bearing.** O. U. Zerk, Cleveland, O.

1,959,258. **Ball Joint Housing.** O. U. Zerk, Chicago, Ill.

1,959,259. **Oscillating Member Sealing Means.** O. U. Zerk, Chicago, Ill.

1,959,262. **Pail Protector.** F. Colabrese, Albert, W. Va.

1,959,311. **Garment.** I. I. Tubbs, Superior, assignor of ½ to G. F. De Wein, Milwaukee, both in Wis.

Dominion of Canada

341,006. **Bathing Cap.** G. W. Abbs, Moose Jaw, Sask.

341,037. **Nonskid Tire.** P. Hjaeresen, Copenhagen, Denmark.

341,069. **Rubber Spring.** A. Spencer, London, England.

341,090. **Weatherstrip.** Best Weather Strip Co., Ltd., Hamilton, Ont., assignee of D. T. Main, Westmount.

341,110. **Abrasive Wheel.** Carborundum Co., assignee of R. C. Benner and H. E. Stowell, co-inventors, all of Niagara Falls, N. Y., U. S. A.
341,118. **Training Panties.** Earnshaw Knitting Co., Newton, assignee of J. H. LeConey, Bedford, both in Mass., U. S. A.
341,127 and 341,128. **Undergarment.** Gotham Hosiery Co. of Canada, Ltd., St. Hyacinthe, P. Q., assignee of C. W. Tobin, S. Orange, N. J., U. S. A.
341,165. **Friction Facing.** Raybestos-Manhattan, Inc., Passaic, N. J., assignee of H. Abert, New York, N. Y., both in the U. S. A.
341,185. **Footwear.** United States Rubber Co., New York, assignee of E. F. Roberts, Mamaroneck, both in N. Y., U. S. A.
341,227. **Cycle Saddle Top.** H. Jelley, Solihull, England.
341,330. **Water Tap Washer.** H. Cohen, Montreal, P. Q.
341,426. **Packing.** A. R. Klingloff, Shrewsbury, Mass., U. S. A.
341,433. **Massage Roller.** J. H. Naylor, Auckland, New Zealand.
341,526. **Road or Railway Vehicle.** La Société Anonyme, Etablissements Willeme, assignee of L. Willeme, both of Nanterre, France.
341,576. **Independent Wheel Suspension.** E. W. Adler, New York, N. Y., U. S. A.
341,641. **Undergarment.** B.V.D. Co., Inc., assignee of M. S. Erlanger, both of New York, N. Y., U. S. A.
341,682. **Tire Cover.** Lyon, Inc., Asbury Park, assignee of G. A. Lyon, Allenhurst, both in N. J., U. S. A.
341,687. **Golf Club.** Metallic Shaft Co., Wilmington, Del., assignee of A. E. Lard, Washington, D. C., both in the U. S. A.
341,733. **Pneumatic Cushion.** C. J. Hardy, assignee of R. W. Sampson, both of New York, N. Y., U. S. A.

United Kingdom

402,847. **Loud Speaker.** G. T. Allen, Broadstairs.
403,574. **Slippers.** W. Strauss, Amsterdam, Holland.
403,679. **Piston Packing.** W. Ormsby, Long Sutton.
403,746. **Shirt Studs.** C. E. Simpson, Northenden.
403,962. **Polishing Pad.** D. Hawksby, Birchington.
403,971. **Wrist Attachment for Tickets.** R. Sutherland, London.
403,997. **Corset.** L. M. Jacks, London.
404,143, 404,146, and 404,161. **Vehicle Wheel.** Michelin & Cie., Clermont-Ferrand, Puy-de-Dome, France.
404,239. **Artificial Ground Surface.** E. Burton, London.
404,240. **Brush.** Hoover, Ltd., Greenford. (Hoover Co., N. Canton, O., U. S. A.)
404,249. **Bathing Cap.** Radium-Gummiwerke, Dellbruck, Germany.
404,356. **Ornithopter.** H. Mascow, Neisse, Germany.
404,519. **Cable.** Naamlooze Vennootschap Hollandsche Draad-En Kabelfabriek, Amsterdam, Holland.
404,530. **Paper Machine Suction Box.** E. & M. Lamort Fils, Marne, France.
404,616. **Cow Milker.** H. H. Johnson, Palmerston North, New Zealand.
404,637. **Trouser Supporting Band.** F. J. Scarlett and R. E. Allison, both of London.
404,703. **Bath Glove.** L. Gilder, London.
404,821. **Adhesive Applier.** American Crayon Co., assignee of F. B. Cooney, both of Sandusky, O., U. S. A.
404,827. **Golf Club.** H. Cawsey and R. James, both of Skegness, and A. S. Westcombe, Spalding.
404,829. **Centrifugal Pump.** J. S. Withers, London. (Jaeger Machine Co., Columbus, O., U. S. A.)
404,887. **Bathing Cap.** D. N. Hodgson, London.
404,922. **Stuffing Box Packing.** Joint Français Soc. Anon., Paris, France.
404,932. **Fur Carroting Machine.** J. Weber and J. F. Tomaino, both of Danbury, Conn., U. S. A.
404,936. **Cash Till.** S. E. Hoop, London.
404,965. **Tire Cover.** O. U. Zerk, Chicago, Ill., U. S. A.
405,118. **Electric Battery Lamp.** E. Lewis, Blackpool.
405,171. **Fountain Pen.** H. Munro, Glasgow, Scotland.
405,248. **Flashlight Lamp.** J. A. M. Harker, London.
405,351. **Elastic Valve.** F. M. Kilmer and L. B. Collins, both of Santa Barbara, Calif., U. S. A.
405,355. **Spraying Apparatus.** W. C. Nokes, Sheerness.
405,370. **Eraser.** J. M. MacCulloch, Glasgow, Scotland.
405,470. **Elastic Valve.** Naamlooze Vennootschap Philips' Gloeilampenfabrieken, Eindhoven, Holland.
405,474. **Tire.** C. E. Viel-Picard, Seine, France.
405,475. **Toy.** E. S. Perry, Birmingham.
405,515. **Foundry Sand Mixer.** H. E. Potts, Liverpool. (Badische Maschinenfabrik & Eisengiesserei vorm. G. Sebold und Sebold & Neff, Baden, Germany.)
405,778. **Antisplash Tap Attachment.** E. Chetham, London.
405,804. **Fountain Pen.** G. Sweetser, London.

TRADE MARKS

United States

311,189. Words: **"Genuine Hard Rubber"** enclosed in double-lined rules. Storage batteries and hard rubber containers. Willard Storage Battery Co., Cleveland, O.
311,241. Representation of a banner containing the word: **"Cornell."** Tube and tire repair kits. The Pep Boys—Manny, Moe & Jack, doing business as Cornell Tire & Rubber Co., Philadelphia, Pa.
311,276. **Dual Duty.** Storage batteries. General Tire & Rubber Co., Akron, O.
311,277. **Ruby.** Erasers, rubber bands, etc. Eberhard Faber Pencil Co., Brooklyn, N. Y.
311,281. **Jumbo.** Storage batteries. General Tire & Rubber Co., Akron, O.
311,336. **Gencorone.** Electrical wires and cables. General Cable Corp., New York, N. Y.
311,337. **Barkhide.** Electrical wires and cables. General Cable Corp., New York, N. Y.
311,339. **Super Streak.** Golf balls. Golf Ball, Inc., Chicago, Ill.
311,340. **Thermax.** Electrical wires and cables. General Cable Corp., New York, N. Y.
311,341. **Genrite.** Electrical wires and cables. General Cable Corp., New York, N. Y.
311,522. **National.** Tires, inner tubes, patches therefor, automobile fan and generator belts, transmission belting, valve bases, hose, and tire flaps. National Tire Stores, Inc., Denver, Colo.
311,534. **Thins.** Prophylactic rubber articles. Youngs Rubber Corp., Inc., New York, N. Y.
311,569. Representation of a rope outlining the words: **"Rough Rider."** Liquid latex prophylactic. Plough, Inc., Memphis, Tenn.
311,570. **King Tut.** Liquid latex prophylactic. Plough, Inc., Memphis, Tenn.
311,578. Representation of a block held by a grip, and the words: **"Sturdee Grip."** Adhesive rubber cement. Windsor-Lloyd Products, Inc., Wilmington, Del.
311,646. **Berkshire.** Inner tubes. C. A. Dana and J. B. Pierce, receivers of Fisk Rubber Co., all of Chicopee Falls, Mass.
311,683. Representation of children's toys, and the words: **"Nursery. Fine Wear for Infants and Children."** Infants' and children's clothing including diapers and shoes. J. C. Penney Co., Wilmington, Del.
311,691. **Sanitary Comfort.** Mats. A. K. Hodes, Fremont, O.
311,714. Representation of a block held by a grip, and the words: **"Sturdee Grip."** Tire and tube patches and repair kits. Windsor-Lloyd Products, Inc., Wilmington, Del.
311,736. **New Deal.** Tires. Lake Shore Tire & Rubber Co., Des Moines, Iowa.
311,808. **Pinch Proof.** Tires and tubes. Pharis Tire & Rubber Co., Newark, O.
311,810. **Algiers.** Adhesives including rubber cement. A. Greenberg, New York, N. Y.
311,891. **Filastic.** Rubber-impregnated cotton yarn. Filastic, Ltd., London, England.
311,925. **Softex.** Sanitary baby pants, step-ins, and aprons. I. B. Kleinert Rubber Co., New York, N. Y.
311,930. **Kleinert's - Acushnet.** Hot water bottles. I. B. Kleinert Rubber Co., New York, N. Y.
311,973. **Canny Scot.** Golf balls. Golf Ball, Inc., Chicago, Ill.
311,978. **Scotch King.** Golf balls. Golf Ball, Inc., Chicago, Ill.
311,990. **"Sturdi-Flex."** Waterproofed sheeting. I. B. Kleinert Rubber Co., New York, N. Y.
312,024. **Fulton.** Electrical storage batteries. Broadway Tire Co., New York, N. Y.
312,029. Frame-like representation consisting of a man repairing a tire; which is held between a worn tire on one side and a repaired tire on the other, and above the representation, the words: **"Spread-A-Tread."** Adhesive preparation for repairing tires, automobile tops, etc. Perfect Mfg. Co., Cincinnati, O.
312,157. Representation of a ring. Tires, inner tubes, transmission and conveyer belts, packing materials, and hose. Societa Italiana Pirelli, Milan, Italy.
312,158. **Wayfarer — Pirelli —.** Tires, inner tubes, transmission and conveyer belts, packing materials, and hose. Societa Italiana Pirelli, Milan, Italy.
312,180. **General.** Brake lining. Raybestos-Manhattan, Inc., Passaic, N. J.
312,365. **Gla-Set.** Adhesive liquid gum. Arabol Mfg. Co., New York, N. Y.

Market Reviews

CRUDE RUBBER

THE strongest supports of the market were the determination of the International Rubber Regulation Committee to tighten up on restriction regulations, and the announcement by the Dutch East Indies Government of taxes on native exports amounting to 4.94¢ on dry rubber and 3.45¢ on wet rubber. Gains in the 4-week period ended June 23 were from 103 to 123 points.

London has been strong, lending support to this market. The feeling there is demonstrated by this paragraph in the review of a trade factor in London: "We see no reason for pessimism, and take this opportunity to repeat our confidence in the market. We remain unconvinced that business affairs in America are as bad as some would have us believe. Labor troubles seem to be settled there with extraordinary rapidity and the falling off in trade which has been so freely prophesized still fails to make itself evident."

As stated later in this report, business in the rubber industry has been about 50% higher this year than last, with orders for the fall from 50 to 75% higher. The authority is Dun & Bradstreet and the Department of Commerce. The reports of tire and automobile manufacturers all show substantial gains so far this year over 1933. Automobile production for the first 5 months is 88% higher, and the recent reductions in prices of low-priced cars stimulated sales and production.

The only flaw in the picture is the increase of 90,000 tons in shipments from abroad for the first 5 months, with prospects of continued large receipts until the restriction quotas go into effect. However a report that a buying pool to take up 50,000 tons was organized in Singapore strengthened the market. Consumption in May dropped below that of April, but the figures had been discounted both here and abroad.

If the restriction agreement makes the expected reduction in stocks, prices by fall should be much stronger.

In the Outside Market business was fair, but lessened because of the labor difficulties in Akron. The rubber sundries manufacturers, however, have been taking a fairly large amount of rubber and should continue to do so on the basis of an estimated increase of 50% in fall business and the incentive to buy now before restriction makes itself felt in higher prices.

Week ended June 2. Despite the stimulating influence of the rise in wheat and oats prices at the start of the week, rubber lost ground. The reason was the vote by the Peoples Council at Batavia against an export tax on rubber. Native producers were almost unanimous in their opposition. The Dutch East Indies Government, expected to override the vote, did so May 30 when our market was closed.

A cable said, "The Dutch East Indies Government has issued rubber restriction ordinances imposing a temporary export duty of 5¢ on dry and native rubber as from June 1."

This report helped prices, enabling quotations to show gains of from 54 to 67 points for the week. Another unfavorable influence early in the session was the feeling of unrest in the rubber industry, and the feeling that strikes are imminent. The temporary settlement of the textile strike may help swing sentiment, in the rubber field. The announcement of the export tax and the start of the restriction agreement as of June 1 turned about the trend that had been on the down side up until that time.

At the close July was 12.89¢ against 12.35¢; September 13.18 against 12.63; December 13.54 against 12.96; January 13.62 against 13.08; and March 13.92 against 13.25.

April production of automobiles was 360,620 units, 7.4% above March, and 99.4% above April, 1933, according to the Department of Commerce. For the first 4 months factory sales totaled 1,093,103 vehicles, compared with 535,690 in the same 1933 period.

A report made by Fenner & Beane on crude rubber says: "Despite the recovery which has already been recorded in the crude market, leaders in the industry, both in Europe and the Far East, are of the belief that during the remainder of the recovery period crude rubber will show more progress than any other important commodity."

E. G. Holt, assistant chief, Leather-Rubber-Shoe Division, also predicted higher prices for rubber goods.

"In fact," runs a report he issued, "it seems surprising that prices for export have not increased more sharply in view of our departure from the gold standard and rising crude rubber prices." His report also said that "The 3-year decline in exports from 1929 to 1932 was in no single year as violent as the decline from 1920 to 1921," and that since the third quarter of 1933 prices have increased, after declining each year since 1926.

Buyers in the Outside Market were few, manufacturers hesitating about making commitments in face of the threatened strike.

June was 13.00¢ against 12⅜¢; July-September 13¼ against 12⅝; October-December 13⅝ against 13.00; and January-March, 14.00 against 13⅜.

Week ended June 9. The rubber market showed substantial gains this week. Rumors of inflation and the report of a pool in Singapore to buy up rubber were largely responsible for the rise. It was said that the gold price would be advanced shortly although no indication was given in the money markets. The strike threat in Akron appeared to have lessened as the week progressed. The market here followed London's example, with good results, except that at the close the feeling was softer, with losses of 3 to 13 points. For the week, however, gains were from 67 to 73 points.

July closed at 13.59¢ against 12.89¢; October 13.99 against 13.30; December 14.21 against 13.54; January 14.35 against 13.62; and March 14.62 against 13.92.

Malayan shipments for May were 69,403 tons, against 56,748 in April, and 43,902 in May, 1933. For the first 5 months exports totaled 297,588 tons, against 206,176 in the 1933 period. The May increase was due to the expectation of restriction and of resulting higher prices. Until the first quota is imposed on August 1 the movement of rubber will probably continue large.

May automobile production, as reported by the National Automobile Chamber of Commerce, was 336,657 units, a gain of 48% over the previous May, but a drop of 11% from April. For the first 5 months 1,477,770 automobiles were produced, a gain of 88% over the same 1933 period.

A Dun & Bradstreet report on the rubber industry reveals plant activity almost 50% higher than during the first 5 months of 1933. Clothing and footwear shipments in the spring were 40% to 45% higher than last year, with fall orders already 50% to 75% higher. The tire industry is said to be in the best position in 4 years because of stabilized prices, a better demand, and cooperation among manufacturers. Large gains in sales were also made in building, packing, druggists' supplies, garden hose, footwear, bathing sundries, and mechanical goods, and the trend of prices has shown an upward tendency since March, 1933.

The only factor marring the picture is the excess of stocks on hand. But the restriction agreement now in effect will eventually correct even that condition.

In the Outside Market factory buyers from Akron were scarce, probably be-

cause of the strike threat, which has made them hesitant about making commitments. But demand from the rest of the industry was good, with substantial gains in prices.

June was 13¾¢ against 13.00¢; July-September 14.00 against 13¼; October-December 14⅜ against 13⅝; and January-March 14¾ against 14.00.

Week ended June 16. After the good rise last week rubber prices met profit taking on Monday, ending in declines of 21 to 31 points. Another setback, 23 to 35 points, was received on Thursday because of the debt suspension announcement by Germany.

Despite these declines rubber prices ended the week with gains of 13 to 22 points as compared with last Saturday. Strength in foreign markets and the export tax on native rubber by the Dutch East Indies government, with indications that the International Rubber Regulation Committee is tightening up on restriction, helped overcome other less favorable factors.

July closed at 13.77¢ against 13.59¢ last week; September 14.01 against 13.88; December 14.40 against 14.21; January 14.57 against 14.35; and March 14.74 against 14.62.

From Batavia, Java, came a Reuter dispatch saying that the East Indian Government was imposing an export duty of 8¢ per half kilo of dry rubber shipped by natives. On July 1 the duty on wet rubber goes into effect and on August 16 that on dry rubber; 14 plantations, comprising 2% of tappable area in the Dutch East Indies on December 31, 1932, had stopped operations April 30, 1934.

While further heavy shipments are expected from the Far East, the May consumption report in the United States showed a decline from the previous month. The Rubber Manufacturers Association reported May consumption of 43,012 long tons, against 44,947 in April and 44,074 in May, 1933. May imports were 47,954 tons, 5% more than in April and 74% more than in May, 1933. Domestic stocks on May 31 were 351,329 tons, against 351,981 on April 30. Crude rubber afloat for the United States totaled 57,921 tons on May 31 against 56,251 on April 30 and 43,342 on May 31, 1933.

Price reductions in the automobile field, including General Motors and Ford, indicate a determination on the part of manufacturers to stimulate sales. Altogether 5 popular-priced cars were reduced in price, with prospects of further concessions.

Automobile production last week was 69,107 units, against 54,185 in the previous week, and 54,197 in the same week last year, according to *Cram's Automotive Reports*. Ford put out 21,485, a jump of 11,500 units, and Chevrolet held at 17,500 units.

In the Outside Market buying by Akron manufacturers continued slow. Business was scattered, with bids made under the market. Speculators, however, operated on a large scale. Prices advanced slightly over last week.

At the close June was 13¾¢ unchanged; July-September 14⅛ against 14.00; October-December 14½ against 14⅜; January-March 14⅞ against 14¾.

Week ended June 23. On Monday transactions on the Rubber Exchange fell below those of the half-session on Saturday, and when news of a walkout by General Tire & Rubber Co. employes was received in the declining market, further losses were scored. Because of the strike factory demand was absent, and speculators sold, making for losses of from 31 to 39 points for the week.

July closed at 13.38¢, compared with 13.77¢ the week before; September 13.66 against 14.01; December 14.02 against 14.40; March 14.35 against 14.74; and May 14.65 against 14.96.

The Commodity Exchange, Inc., will be closed Saturdays from June 23 to September 1.

The position of manufacturers is strong, as evidenced by tire statistics received this week. At the close of April, 11,980,731 pneumatic casings were in the hands of manufacturers, compared with 11,650,661 at the close of March and 6,773,724 at the close of April, 1933. Shipments, according to the same report released by The Rubber Manufacturers Association, Inc., were 4,438,378 in April, against 4,222,962 in March and 3,653,943 in April, 1933. For the same periods production was 4,769,980, 5,180,122, and 3,123,494, respectively.

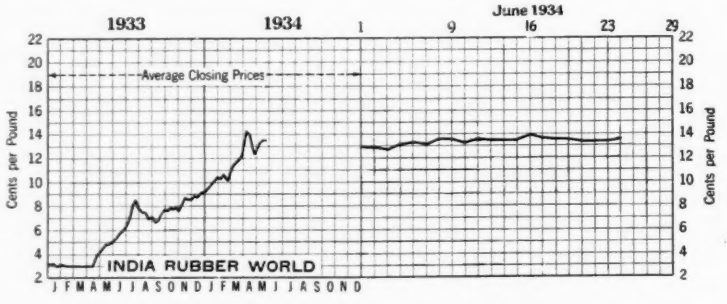
Further details from abroad reveal that the tax on native exports from the Dutch East Indies amounts to 4.94¢ per pound in U. S. currency on dry rubber and 3.45¢ per pound on wet rubber.

As the market letter of H. Hentz & Co. put it, "The trade has been quite encouraged by the heavy taxes imposed on Dutch native exports."

Last week's automobile output was estimated by *Cram's Automotive Reports* to be 71,293 units, against 69,107 the previous week and 57,511 in the same 1933 week. Ordinarily at this time of the year production drops, but cuts in prices by the low-priced manufacturers stimulated demand by dealers and increased retail demand for these cars.

Reports from automobile manufacturers in the last few weeks show business on the upturn. The latest report from Hudson reveals an increase of 101.5% in May production over last year's and an increase of 267% in the first 5 months of this year. General Motors stated that as a result of their recent exhibitions orders for passenger cars jumped 34.3% and for trucks 177.3%. Sales of Chevrolet for the first 10 days in June were 4,250 above those for the first 10 days in May.

E. I. du Pont de Nemours & Co., Inc., made an announcement of interest to the rubber trade this week. They have been selling synthetic rubber, known as DuPrene for some time; the price, $1.00 a pound, however, is prohibitive, but could be produced for ⅔ less if



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	May, 1934										June, 1934													
	21	22	23	24	25	26	28	29	30*	31	1	2	4	5	6	7	8	9	11	12	13	14	15	16
No. 1 Ribbed Smoked Sheet	12⅛	12⅝	12	12⅛	12¼	12¼	12	12	..	12¼	12⅞	12⅞	12¾	13⅛	13¼	13⅛	13⅝	13⅝	13¼	13⅝	13¾	13½	13½	13⅛
No. 2 Ribbed Smoked Sheet	12⅛	12¼	11⅝	11¾	11⅞	11⅞	11⅝	11⅝	..	11⅞	12½	12½	12⅜	12¾	12⅞	12¾	13⅛	13⅛	12⅞	13⅛	13⅜	13⅛	13⅛	13⅛
No. 3 Ribbed Smoked Sheet	12¼	12	11⅜	11½	11⅝	11⅝	11⅜	11⅜	..	11⅝	12¼	12¼	12⅛	12½	12⅝	12½	12⅞	12⅞	12⅝	12⅞	13⅛	12⅞	12⅞	13⅛
No. 4 Ribbed Smoked Sheet	12	11¾	11⅛	11¼	11⅜	11⅜	11⅛	11⅛	..	11⅜	12	12	11⅞	12⅛	12¼	12⅛	12⅝	12⅝	12⅜	12⅝	12⅞	12⅝	12⅝	12⅞
No. 1 Thin Latex Crepe..	14⅞	14⅝	14	14⅛	14¼	14¼	14	14	..	14¼	14⅞	14⅞	14¾	15	15⅛	15⅛	15½	15½	15¼	15½	15⅝	15⅜	15⅜	15⅝
No. 1 Thick Latex Crepe.	14⅝	14⅜	13⅞	14	14⅛	14⅛	13⅞	13⅞	..	14⅛	14¾	14¾	14⅝	14⅞	15	15	15⅜	15⅜	15	15¼	15½	15⅛	15⅛	15⅜
No. 1 Brown Crepe	10⅝	10⅛	9½	9⅝	9¾	9¾	9⅜	9⅜	..	9⅝	10¼	10¼	10½	10¾	10⅞	10⅞	11¼	11¼	11	11⅜	11½	11¼	11¼	11½
No. 2 Brown Crepe	10½	10	9⅜	9½	9⅝	9⅝	9¼	9¼	..	9⅜	10	10	10¼	10½	10⅝	10⅝	11	11	10¾	11¼	11⅜	11	11	11¼
No. 2 Amber	10⅝	10⅛	9½	9⅝	9¾	9¾	9⅜	9⅜	..	9⅝	10¼	10¼	10½	10¾	10⅞	10⅞	11¼	11¼	11	11⅜	11½	11¼	11¼	11½
No. 3 Amber	10½	10	9⅜	9½	9⅝	9⅝	9¼	9¼	..	9⅜	10	10	10¼	10½	10⅝	10⅝	11	11	10¾	11¼	11⅜	11	11	11¼
No. 4 Amber	10	9½	8⅞	9	9⅛	9⅛	8¾	8¾	..	8⅞	9½	9½	9¾	10	10⅛	10⅛	10½	10½	10¼	10¾	10¾	10½	10½	10¾
Rolled Brown	8½	8¼	7⅞	8	8⅛	8⅛	7¾	7¾	..	7⅞	8¼	8¼	8	8¼	8⅝	8⅝	9	9	8¾	9¼	9	8¾	8¾	9

*Holiday.

there was no competition from crude.

"Synthetic rubber," according to the report, "is not competing with natural rubber, as it . . . has special uses. . . . We are not pushing the sale outside of America, as there is little available for export. The successful manufacture of synthetic rubber tires was reported many months ago in technical publications both here and in London. They are 'laboratory tires,' too expensive for the markets."

New York Quotations

New York outside market rubber quotations in cents per pound

	June 26, 1933	May 25, 1934	June 25, 1934
Plantations			
Rubber latex, normal ....gal.	42	60	60
Sheet			
Ribbed, smoked, spot	6 /6⅛	12 /12⅛	13⅝
Aug.-Sept.	6⅛/6¼	.. ..	13⅞
Oct.-Dec.	6⅛/6⅜	12⅝/12¾	14¼
Jan.-Mar.	6⅛/6¾	12⅞/13⅛	14⅜
Crepe			
No. 1 thin latex, spot	6¾/6⅞	14 /14⅛	15½/15⅝
Aug.-Sept.	6⅛/7	.. ..	15⅜/15¾
Oct.-Dec.	7⅛/7¼	14⅝/14¾	16 /16⅛
Jan.-Mar.	7⅛/7½	14⅞/15⅛	16⅜/16½
No. 3 Amber, spot	4⅛/5	10 /10⅛	11⅜
No. 1 Brown	5 /5⅛	9⅞/10⅛	11½
Brown, rolled	4½/4⅝	8½/ 8¾	9⅜/ 9½
Paras			
Upriver fine	8¾	11¼	11¼
Upriver fine	*11½	*13¾	*13¼
Upriver coarse	....	8	7½
Upriver coarse	*7¼	*10½	*10¼
Islands fine	8½	10½	10½
Islands fine	*11½	*13¼	*13
Acre, Bolivian fine	9	11½	11½
Acre, Bolivian fine	*11¾	*14	*13½
Beni, Bolivian	9¼	11¾	11¾
Madeira fine	9	11¼	11¼
Caucho			
Upper ball	....	8	7½
Upper ball	*7	*10½	*10¼
Lower ball	....	7½	7
Pontianak			
Bandjermasin	6	7	6
Pressed block	10	12	11¼
Sarawak	6	7	6
Manicobas			
Manicoba, 30% guar.	†5	†6	†6¾
Mangabiera, thin sheet	..	..	..
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	10	10	10
Black Kassai	9¾	9¾	9¾
Prime Niger flake	16⅛	16	16
Gutta Percha			
Gutta Siak	10½	10	10
Gutta Soh	13	14½	15
Red Macassar	1.75	1.45	1.50
Balata			
Block, Ciudad Bolivar	27	50	50
Manaos block	28	50	50
Surinam sheets	35	52	47
Amber	39	55	52

*Washed and dried crepe. Shipments from Brazil. †Nominal.

Because of the strike in Akron, business on the Outside Market was quiet, with prices dropping. Spot ribbed smoked sheets closed at 13⅜¢ against 13¾¢; July-September 13⅝ against 14⅛; October-December 14.00 against 14½; and January-March 14⅜ against 14⅞.

On June 25 strength in foreign markets and a London report that the International Rubber Regulation Committee would meet this day, possibly to revise export quotas downward, considerably strengthened the rubber market. After rising to net gains of 30 points, the tone relaxed somewhat under warehouse liquidation, and the exchange futures closed 15 to 23 points higher, as follows: July 13.55¢, September 13.83, November 14.08, February 14.35, March 14.55, and May 14.80.

In the Outside Market, however, trade activity did not improve. Less attention was given the control committee report as the day wore on, and London could not substantiate it. Closing prices were: Spot 13 15/16¢, July-September 13 13/16, October-December 14 3/16, and January-March 14 5/16.

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Tire Production Statistics

	Pneumatic Casings—All Types		
	Inventory	Production	Total Shipments
1932	6,115,487	32,067,732	32,200,820
1933	7,110,456	36,243,384	35,274,970
1934			
Jan.	9,393,857	3,803,939	3,125,726
Feb.	10,403,282	4,205,039	3,186,363
Mar.	11,301,142	5,024,718	4,096,273
Apr.	11,621,310	4,626,881	4,305,227
	Solid and Cushion Tires		
1932	23,830	97,089	108,581
1933	.....	130,987	126,990
1934			
Jan.	29,971	13,792	13,946
Feb.	.....	12,440	12,797
Mar.	28,280	15,017	15,273
Apr.	.....	16,217	13,701
	Inner Tubes—All Types		
1932	5,399,551	29,513,246	30,328,536
1933	6,251,941	34,044,689	33,112,472
1934			
Jan.	8,150,708	3,444,574	3,102,931
Feb.	8,892,154	3,956,082	3,223,591
Mar.	9,936,574	5,038,649	3,994,683
Apr.	10,267,331	4,593,370	4,212,020

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%)
	Cotton Fabric Pounds	Crude Rubber Pounds	Gallons
1932	128,981,222	416,577,533	15,703,800,000
1933	148,989,293	512,489,423	15,880,746,000
1934			
Jan.	16,437,210	59,957,163	1,239,798,000
Feb.	18,720,923	63,400,171	1,047,816,000
Mar.	20,927,389	75,636,859	1,289,472,000
Apr.	19,371,041	69,930,591	1,374,870,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 80% for previous years, with the exception of gasoline consumption.

U. S. Crude and Waste Rubber Imports for 1934

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1934	Totals 1933	Balata	Miscellaneous	Waste
Jan. ....tons	44,988	973	182	61	..	..	..	46,204	31,110	73	693	32
Feb.	30,164	750	118	..	..	..	..	31,032	18,875	70	607	..
Mar.	43,204	901	450	..	..	50	..	44,605	27,879	169	415	157
Apr.	44,394	827	324	..	17	100	..	45,662	19,459	165	633	99
May	46,440	1,230	181	..	3	100	..	47,954	27,556	143	616	117
Total, 5 mos., 1934....tons	209,190	4,681	1,255	61	20	250	..	215,457	.....	620	2,964	405
Total, 5 mos., 1933....tons	120,810	2,737	1,299	33	..	...	..	.....	124,879	134	2,926	11

Compiled from the Rubber Manufacturers Association, Inc., statistics.

New York Outside Market (Continued)

	June, 1934					
	18	19	20	21	22	23*
No. 1 Ribbed Smoked Sheet	13⅝	13½	13½	13⅜	13⅜	..
No. 2 Ribbed Smoked Sheet	13¼	13⅜	13⅜	13	13	..
No. 3 Ribbed Smoked Sheet	13	12⅞	12⅞	12¾	12¾	..
No. 4 Ribbed Smoked Sheet	12¾	12⅝	12⅝	12½	12½	..
No. 1 Thin Latex Crepe	15⅜	15¼	15¼	15⅛	15⅛	..
No. 1 Thick Latex Crepe	15¼	15⅛	15⅛	15	15	..
No. 1 Brown Crepe	11⅜	11¼	11¼	11¼	11¼	..
No. 2 Brown Crepe	11⅛	11	11	11	11	..
No. 2 Amber	11⅜	11¼	11¼	11¼	11¼	..
No. 3 Amber	11¼	11⅛	11⅛	11	11	..
No. 4 Amber	10⅝	10½	10½	10½	10½	..
Rolled Brown	8⅞	8¾	8¾	8¾	8¾	..

*Closed.

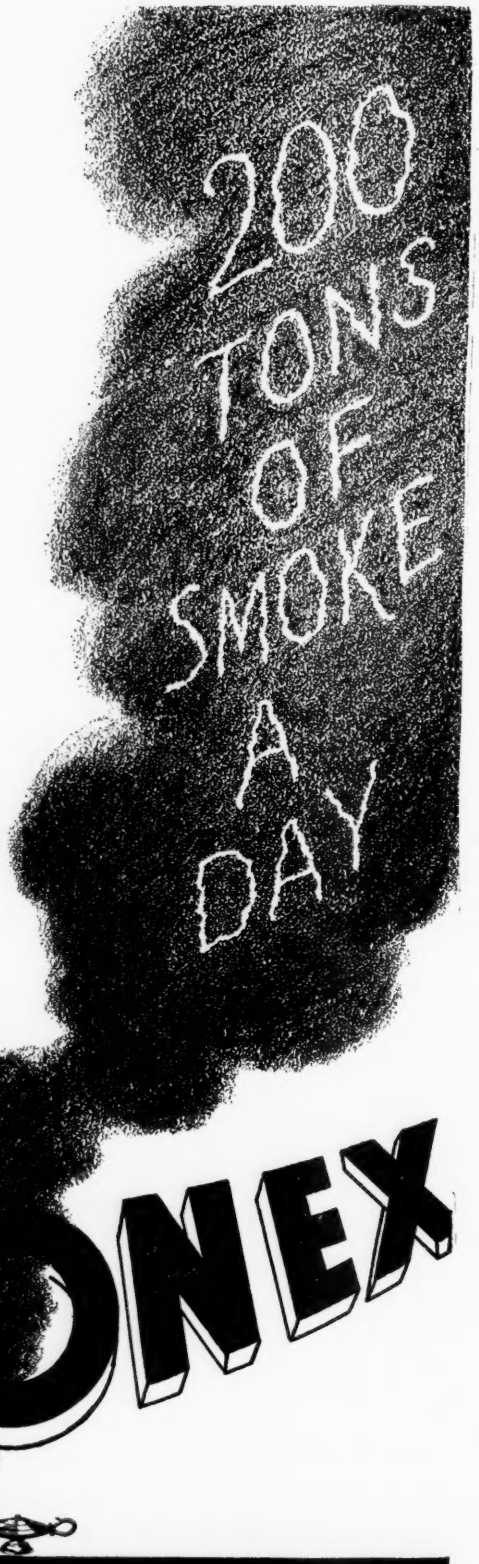
Low and High New York Spot Prices

All Prices in Cents per Pound

	June		
PLANTATIONS	1934*	1933	1932
Thin latex crepe	14¾/15⅝	5⅞/7 1/16	3 1/16/3 1/16
Smoked sheet, No. 1 ribbed	12¾/13¾	5¼/6 1/16	2⅝/2¾
PARAS			
Upriver fine	11 /12	7½/8½	5½

*Figured to June 25, 1934.

POINTING the way...



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COMPOUNDING INGREDIENTS

RUBBER goods manufacturing in the important fields of tires, tubes, and footwear has slowed up seasonally somewhat earlier and to a more marked extent than usual. In mechanical goods lines production is fair, the best that can be said of the other divisions of the rubber industry.

ACCELERATORS. General slackness of rubber goods production has reduced the demand for rubber accelerators to routine proportions.

CARBON BLACK. Demand for blacks is being well maintained by tire manufacturers. Prices are firm and unchanged.

LITHARGE. For the first time since last October prices were reduced, 5-ton lot prices established, and zone pricing set early in June. Litharge demand is routine.

LITHOPONE. Sales continue moderate at unchanged prices.

MINERAL RUBBER. Sales of mineral rubber increased markedly because of the advance in the price of crude rubber.

RUBBER SOLVENTS. Active consuming demand prevails. Tank car lots of heavy and light grades at Group 3 refineries are quoted unchanged at 6⅞¢ per gallon.

TITANIUM PIGMENTS. Excellent business holds for these products in the rubber trade. Prices are firm and unchanged.

ZINC OXIDE. Domestic oxide prices in force since April 1 are extended to cover the remainder of the year. Demand has improved and is rated generally good.

New York Quotations

June 25, 1934

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	
Rottenstone, domestic	ton	$23.50
English	ton	
Accelerators, Inorganic		
Lead, white, dry (bbls.)	lb.	.06½
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06½
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06
Accelerators, Organic		
A-1 (Thiocarbanilid)	lb.	.21 / $0.25
A-5-10	lb.	.33 / .36
A-7	lb.	.53 / .65
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
Accelerator 49	lb.	.39 / .49
Acrin	lb.	
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	
Anhydroformaldehyde-para-toluidine	lb.	
Barak	lb.	
Butene	lb.	
Captax	lb.	
Crylene	lb.	
paste	lb.	
DBA	lb.	
DBX	lb.	
Di-esterex N.	lb.	
DOTG	lb.	.46 / .56
DPG	lb.	.36 / .46
du Pont 808	lb.	
833	lb.	
Ethylidine aniline	lb.	
Formaldehyde aniline	lb.	
Guantal	lb.	.42 / .51
Heptene base	lb.	
Hexamethylenetetramine	lb.	.37
Lead oleate, No. 999	lb.	.085
Witco	lb.	.10
Lithex	lb.	
Monex	lb.	
Novex	lb.	
Pipsol X	lb.	3.55 / 4.00
Plastone	lb.	
R-2	lb.	1.55 / 1.90
base	lb.	4.55 / 5.00
R & H 40	lb.	
50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tetrone A	lb.	
Thio	lb.	
Thiocarbanilid	lb.	.20
Thionex	lb.	
Trimene	lb.	
base	lb.	
Triphenyl guanidine	lb.	.58 / .60
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
ZBX	lb.	
Z-88-P	lb.	.48 / .60
Zimate	lb.	
Acids		
Acetic 28% (bbls.)	100 lbs.	2.91 / 3.16
glacial (carboys)	100 lbs.	14.00
Sulphuric, 66°	ton	15.50
Age Resisters		
Age-Rite Gel	lb.	
powder	lb.	
resin	lb.	
white	lb.	
Albasan	lb.	
Antox	lb.	
BLE	lb.	
Flectol A	lb.	$0.54 /$0.60
B	lb.	.54 / .60
H	lb.	
Hiflex B	lb.	
Neozone	lb.	
Oxynone	lb.	.66 / .90
Parazone	lb.	
Permalux	lb.	
Resistox	lb.	.52 / .65
Solux	lb.	
VGB	lb.	
Zalba	lb.	
Alkalies		
Caustic soda, liquid, Columbia	100 lbs.	2.25
solid	100 lbs.	2.60
Antiscorch Materials		
Retarder-W	lb.	
R. H. Cumar	lb.	.075 / .085
UTB	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Binders, Fibrous		
Cotton flock, dark	lb.	.10½ / .13
dyed	lb.	.50 / .85
white	lb.	.14 / .20
Rayon flock, colored	lb.	1.60 / 1.75
white	lb.	1.40
Brake Lining Saturants		
B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017
Colors		
BLACK		
Bone	lb.	.05½ / .15½
Lampblack (commercial)	lb.	.07 / .12
BLUE		
Brilliant	lb.	
Prussian	lb.	.35½
Toners	lb.	.80 / 3.50
Ultramarine, dry	lb.	.10
BROWN		
Mapico	lb.	.13
Sienna, Italian, raw	lb.	.12½
GREEN		
Brilliant	lb.	
Chrome, light	lb.	.20
medium	lb.	.20
oxide	lb.	.21½ / .22½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, R. M. P. No. 3	lb.	$0.46
Sulphur free	lb.	.48
7-A	lb.	.33
Z-2	lb.	.20
Chinese	lb.	
Crimson	lb.	
Iron Oxides		
Rub-Er-Red	lb.	.09¼
Mapico	lb.	.09¼
Medium	lb.	
Scarlet	lb.	
Toners	lb.	.80 / $2.00
WHITE		
Lithopone (bags)	lb.	.04½ / .04¾
Albalith	lb.	.04½ / .04¾
Azolith	lb.	.04¼ / .04¾
Cryptone No. 19	lb.	.06 / .06¼
CB No. 21	lb.	.06 / .06¼
Rayox	lb.	
Titanox-A	lb.	.17 / .18¾
B	lb.	.06 / .06½
C	lb.	.06 / .06½
Zinc Oxide		
Azo 35 (35% leaded)	lb.	.05¾ / .06
Z (10% leaded)	lb.	.06¼ / .06½
ZZ (3-5% leaded)	lb.	.06¼ / .06½
ZZZ (lead free)	lb.	.06½ / .06¾
Black label (lead free)	lb.	.06½
Ceramatone	lb.	.06½ / .06¾
F. P. Florence, green seal	lb.	.09⅜ / .09⅝
red seal	lb.	.08⅜ / .08⅝
white seal (bbls.)	lb.	.10⅝
Green label (lead free)	lb.	.06½
seal, Anaconda	lb.	.09⅜ / .09⅝
Horsehead (lead free) brand		
Selected	lb.	.06½ / .06¾
Special	lb.	.06½ / .06¾
XX	lb.	.06½ / .06¾
red	lb.	.06½ / .06¾
Kadox, black label	lb.	.09⅜ / .09⅝
blue label	lb.	.08⅜ / .08⅝
red label	lb.	.07 / .07¼
Lead free (all grades) Anaconda	lb.	.12½ / .12¾
Leaded, 5%, Anaconda	lb.	.06½ / .06¾
35%, Anaconda	lb.	.06¼ / .06½
Lehigh (leaded)	lb.	.05¾ / .06
Red label (lead free)	lb.	.05¾ / .06
seal, Anaconda	lb.	.06½
Standard (leaded)	lb.	.08¾ / .08⅝
U. S. P. (bbls.)	lb.	.06¼ / .06½
White seal, Anaconda	lb.	.10⅝
XX zinc sulphide	lb.	.11 / .11¾
YELLOW		
Chrome	lb.	.15
Lemon	lb.	
Mapico	lb.	.09½
Ocher, domestic	lb.	.01¾ / .0195
Toners	lb.	2.50
Dispersing Agents		
Bardex	lb.	.023 / .025
Bardol	lb.	.021 / .023
Darvan	lb.	
Factice—See Rubber Substitutes		
Fillers, Inert		
Asbestine	ton	15.00
Barytes (f.o.b. St. Louis)	ton	22.20
off color	ton	
white	ton	
Blanc fixe, dry precip.	ton	70.00 / 75.00
pulp, 66⅔%	ton	42.50
Calcene	100 lbs.	1.75

Infusorial earth	lb.	$0.03
Kalite No. 1	ton	
No. 3	ton	
Suprex, white, extra light	ton	60.00 /75.00
heavy	ton	45.00 /60.00
Whiting		
Chalk, precipitated	lb.	
Columbia brand	ton	8.00
Domestic	ton	
Hakuenka	lb.	
Paris white, English cliff-stone	100 lbs.	
Sussex	ton	
Witco	ton	15.00
Wood flour (f.o.b. New Hampshire)	ton	21.00 /55.00

Fillers for Pliability

Flex	lb.	
Fumonex	lb.	.03 / .05½
P-33	lb.	
Thermax	lb.	
Velvetex	lb.	.02 / .05

Finishes

IVCO lacquer, clear	gal.	2.60 / 2.90
colors	gal.	2.70 / 3.35
Mica, amber	lb.	.03½/ .05
Rubber lacquer	gal.	
No. 106	gal.	3.00
Starch, Corn, pwd.	100 lbs.	3.01 / 3.21
potato	lb.	.05¼/ .06
Talc, dusting	ton	15.00 /25.00
Pyrax	ton	

Latex Compounding Ingredients

Accelerator 552	lb.	
Aquarex	lb.	
Aresco	lb.	.28 / .40
Catalpo	ton	
Colloidal color pastes	lb.	
sulphur	lb.	
zinc oxide	lb.	
Disinfectants	lb.	
Dispersaid	lb.	$1.50
Dispersed Antox	lb.	
factice compound	lb.	.26
Emo, brown	lb.	.12
white	lb.	.12
Emulsified Heliozone	lb.	
Igepon A	lb.	
Nekal BX (dry)	lb.	
Neozone L	lb.	
Palmol	lb.	.085
Tepidone	lb.	
Vulcan colors	lb.	

Mineral Rubber

B. R. C. No. 20	lb.	.014 /$0.016
Black Diamond	ton	
Genasco (fact'y)	ton	25.00 /27.00
Gilsonite (fact'y)	ton	
Hydrocarbon, granulated.	ton	35.00 /37.00
hard	ton	
soft	ton	
Parmr Grade 1	ton	21.00 /26.00
Grade 2	ton	21.00 /26.00
265°	ton	

Mold Lubricants

Rusco mold paste	lb.	.12 / .30
Sericite	ton	
Soapbark (cut)	lb.	.07 / .08
Soapstone	ton	15.00 /25.00

Oils

Castor, blown	lb.	$0.11½/$0.11¾
Poppyseed (bbls.)	gal.	1.50 / 1.60
Rapeseed, refined (bbls.)	gal.	.40
Red, distilled (bbls.)	lb.	.06¾/ .07⅞

Protective Colloid

Casein, domestic	lb.	.12½/ .13

Reclaiming Oils

B. R. V.	lb.	.039 / .041
S. R. O.	lb.	.012 / .014

Reenforcers

Carbon Black		
Aerfloted arrow specification black	lb.	.0535/ .0825
Arrow Compact	lb.	
Century (delivered)	lb.	.0445/ .0535
"Certified" Cabot	lb.	
Spheron	lb.	
Disperso (delivered)	lb.	.0445/ .0535
Dixie, c.l., f.o.b., New Orleans, La.; Galveston or Houston, Tex.	lb.	.0445
local stock, delivered	lb.	.07 / .08¼
Gastex	lb.	.03 / .07
Kosmos, c.l., f.o.b. New Orleans, La.; Galveston or Houston, Tex.	lb.	.0445
local stock, delivered	lb.	.07 / .08¼
Micronex	lb.	.0535/ .0825
Ordinary (compressed or uncompressed)	lb.	.0535/ .0825
Carbonex	lb.	.030 / .0375
S	lb.	.0315/ .040
Clays		
Blue Ridge, dark	ton	
China	ton	
Dixie	ton	
McNamee	ton	
Par	ton	
Perfection	ton	7.50 / 9.00
Standard	ton	
Suprex No. 1, selected.	ton	$10.00 /$24.00
No. 2, standard	ton	8.00
Cumar EX	lb.	.0275/ .0375
Glue, hide	lb.	.16 / .22½

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Para-Dors	lb.	
Rodo No. 0	lb.	
No. 10	lb.	

Rubber Substitutes or Factice

Amberex	lb.	.13¾
Black	lb.	.06 / .08
Brown	lb.	.07 / .11
White	lb.	.07½/ .12

Softeners

B. R. C. No. 555	lb.	.012 / .014
B. R. T. No. 7	lb.	.015 / .017
Burgundy pitch	lb.	.05 / .06
(net weight)	lb.	.06 / .08
Corn oil, crude (bbls.)	lb.	.05⅞
Cycline oil	gal.	.15 / .28
Fluxol	ton	
Hardwood pitch, c.l.	ton	23.50 /25.00
Palm oil (Witco)	lb.	.05
Petrolatum, light amber	lb.	.04¼
Pigmentar (drums)	gal.	$0.23 /$0.25
Pigmentaroil (drums)	gal.	.23 / .25
Pine oil, dest. distilled (drums)	gal.	.48 / .50
pitch	bbl.	5.75
tar	gal.	.30
specification retort, l.c.l.	gal.	.24 / .26
Plastogen	lb.	
Rosin oil, compounded	gal.	.33 / .40
Rubtack	lb.	.10
Sperso	lb.	
Tackol	lb.	.085 / .18
Tonox	lb.	
Witco, No. 20	gal.	.15

Softeners for Hard Rubber Compounding

Resin C-55°	lb.	.0125/ .0145
70°	lb.	.0125/ .0145
85°	lb.	.0125/ .0145

Solvents

Benzol 90% (drums)	gal.	.28
Bondogen	gal.	
Carbon bisulphide (drums)	lb.	.05½/ .12
tetrachloride	lb.	.05¼
Dipentene, commercial	gal.	.34 / .44
Rubber (f.o.b. Group 3 refineries)	gal.	.06⅞
Toluol	gal.	.39
Turpentine, steam distilled	gal.	.48
wood, dest. distilled (drums)	gal.	.41 / .43

Stabilizers for Cure

Laurex, ton lots	lb.	
Stearex B	lb.	.08 / .10½
flake	lb.	.07½/ .10
Stearic acid, dbl. pres'd	lb.	.10 / .15
Zinc stearate	lb.	

Synthetic Rubber

DuPrene	lb.	1.00

Tackifier

B. R. H. No. 2	lb.	.015 / .017

Vulcanizing Ingredients

Sulphur		
Chloride, drums	lb.	.03½/ .04
Flowers, extrafine refined, U.S.P.	100 lbs.	
Rubber	100 lbs.	1.95 / 2.70
Telloy	lb.	
Vandex	lb.	

(See also Colors—Antimony)

Wax

Paraffine	lb.	.06½

U. S. Exports

United States exports of rubber manufactures were well maintained in the first 4 months of 1934 as compared with 1932 and 1933, amounting to $6,881,292 against $6,276,898 in the 1932 period and $4,692,032 in that for 1933. Our very low export trade in the early months of 1933 was 26% below the preceding year, but more than recovered in 1934 by the increase of 47% over the first 4 months of 1933 and of 10% over the like period of 1932.

Plantation Rubber Crop Returns by Months

	Borneo (26 Companies)		Ceylon (102 Companies)		India and Burma (21 Companies)		Malaya (338 Companies)		Netherlands East Indies — Java (60 Companies)		Netherlands East Indies — Sumatra (60 Companies)		Miscellaneous (8 Companies)		Total (615 Companies)	
1933	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index
January	360	73.6	1,126	55.2	120	21.4	12,465	100.2	2,561	97.5	3,854	95.6	124	68.5	20,610	92.2
February	323	66.1	907	44.4	46	8.2	11,635	93.6	2,703	102.9	4,225	104.8	54	29.8	19,893	89.0
March	319	65.2	994	48.7	126	22.4	10,512	84.5	2,756	105.0	4,177	103.6	93	51.4	18,977	84.9
April	304	62.2	1,244	61.0	139	24.7	10,529	84.7	2,845	108.3	3,844	95.3	121	66.9	19,026	85.1
May	333	68.1	881	43.2	117	20.8	11,877	95.5	2,995	114.1	4,160	103.2	134	74.0	20,497	91.7
June	334	68.3	996	48.8	31	5.5	12,410	99.8	2,965	112.9	4,235	105.0	140	77.3	21,111	94.4
July	354	72.4	1,260	61.7	29	5.2	12,527	100.7	2,919	111.2	4,557	113.0	133	73.5	21,779	97.4
August	369	75.5	1,399	68.5	40	7.1	12,849	103.3	2,449	93.3	4,435	110.0	127	70.2	21,668	96.9
September	373	76.3	1,488	72.9	197	35.1	12,255	98.6	2,443	93.0	4,643	115.2	110	60.8	21,509	96.2
October	388	79.3	1,216	59.6	394	70.1	12,829	103.2	2,824	107.5	4,783	118.6	112	61.9	22,546	100.8
November	412	84.3	1,846	90.4	495	88.1	12,922	103.9	3,033	115.5	4,768	118.3	113	62.4	23,589	105.5
December	388	79.3	1,902	93.2	519	92.3	13,974	112.4	3,096	117.9	4,929	122.2	118	65.2	24,926	111.5
Totals	4,257	...	15,259	...	2,253	...	146,784	...	33,589	...	52,610	...	1,379	...	256,131	...
Monthly Average	355	72.6	1,272	62.3	188	33.5	12,232	98.4	2,799	106.6	4,384	108.7	115	63.5	21,345	95.4
1934																
January	368	75.2	1,402	68.7	403	71.7	12,981	104.4	2,821	107.4	4,411	109.4	130	71.8	22,516	100.7
February	355	72.6	1,111	54.4	127	22.6	12,108	97.4	3,041	115.8	4,738	117.5	70	38.7	21,550	96.4
March	389	79.6	1,201	58.8	382	68.0	11,812	95.0	3,425	130.4	4,775	118.4	108	59.7	22,092	98.8
April	377	77.1	1,427	69.9	488	86.8	11,324	91.1	3,328	126.7	4,545	112.7	142	78.5	21,631	96.7
4 months ending April,																
1934	1,489	...	5,141	...	1,400	...	48,225	...	12,615	...	18,469	...	450	...	87,789	...
1933	1,306	...	4,271	...	431	...	45,141	...	10,865	...	16,100	...	392	...	78,506	...

Note: Index figures throughout are based on the monthly average for 1929=100. Issued May 24, 1934, by the Commercial Research Department, The Rubber Growers' Association, Inc., London, England.

COTTON AND FABRICS

THE most sustaining influence in the cotton market during June was the weather. Preliminary estimates will probably show the crop lost ground in June when normally it should markedly improve. Contrasted to the drought in the West has been the heavy rainfall in the eastern cotton states, climaxed by a tropical storm in the Mississippi basin. A relief in precipitation may still save the crop in the East, but permanent damage is said to have been done to the crop in Texas.

Most of the gains of about 55 points in the 4 weeks ended June 23 were prompted by weather reports. The cotton textile strike threat early in the month, however, also aided prices. Because of an order under the NRA code to cut production by 25%, cotton textile workers, numbering 300,000, were on the verge of walking out—not because of the cut in production, but because of the resulting cut in wages.

Germany's suspension of debt payments and the rigid control over imports and exports because of the retaliation move by Great Britain, which seized all favorable German balances held in England, will probably hurt our exports. The figure is now 500,000 bales behind last year, and since Germany is about the third largest importer of our cotton, any sharp curtailment in her imports will undoubtedly decrease our exports.

Takings by domestic mills in May were good. Manufacturers figuring on higher prices took much cotton to have a stock of cheap cotton on hand.

A rise in cotton prices, suggested to the industry under the NRA code, met strong opposition at hearings held in Washington, with George A. Sloan, president of the Cotton Textile Institute, expressing the consensus of opinion as follows: "The purchasing power of the public has not so far improved as to permit it [an increase in prices]. It would mean a fresh set-back to employment in our industry which has been obliged to reduce its production by 25% as the result of the seasonal slowing demand for cotton textiles. Let's not tamper at this time at least with a situation that is serious enough in itself in respect to employment of labor."

Summarizing the outlook it appears that the brightest hope of better prices in cotton rests with the curtailment program controlled by the AAA, aided by the drought in the West and the excessive rains in the East.

Week ended June 2. The weather, the action of wheat and oats, and the threatened textile strike were the principal influences on the cotton market for the week. The strike called for Monday by 300,000 textile workers was called off after the close of the market on Saturday. Under the settlement between General Johnson and Thomas F. McMahon, president of the United Textile Workers, the 25% curtailment order would go into effect. The admitted reason for the strike—"to secure a 33⅓% increase in hourly rates of pay and certain other demands"—would be studied by the NRA Research and Planning Division.

For the session prices gained from 33 to 36 points. July closed at 11.76¢ against 11.43¢; October 11.99 against 11.63; December 12.10 against 11.74; January 12.16 against 11.79; March 12.26 against 11.92; and May 12.36 against 12.01.

The world's stock of American cotton in May was put at 13,848,000 bales by the Cotton Exchange Service, 1,708,000 less than last year, and 2,356,000 less than 2 years ago. The total domestic stock is 9,860,000 bales, or 1,868,000 less than last year. A private report estimated the new crop's condition at 73% on 29,449,000 acres, making a crop of 11,122,000 bales, or 1,500,000 under last year.

Forwardings last week to domestic mills were 63,000 bales, against 74,000 in the preceding week and 135,000 a year ago. The strike threat brought much buying, but mills held back and reduced the probable volume of orders. Next week a number of buyers are expected in the New York market, and indications are that they will make a concerted effort to cut quotations from the opening spring prices.

Week ended June 9. Unfavorable weather in the Cotton Belt caused a good gain in cotton prices this week. In the eastern section of the Belt excessive rains and sub-normal temperatures brought reports of sappy growths, grassy fields, and heavy weevil emergence. Holders of cotton, in view of present conditions, are not selling freely. A block of orders did come into the market, but principally from speculators and those who had 10¢ loans on cotton from the government.

At the close, prices were from 30 to 32 points above last Saturday's. July was 12.06¢ against 11.76¢; October 12.30 against 11.99; December 12.42 against 12.10; January 12.47 against 12.16; March 12.57 against 12.26; and May 12.66 against 12.36.

Forwardings to domestic mills a week ago were 51,000 bales, against 63,000 in the preceding week and 154,000 a year ago. It was the lowest amount forwarded since August, 1932. Trading was better in gray cloths and sheetings, with prices a bit stronger.

World stocks of cotton on May 1 were estimated at 22,006,000 bales, by the Cotton Exchange Service, or 814,000 less than last year, but the season's supply is expected to be 41,164,000 bales, an increase of 247,000 bales over last season. Consumption for the first 9 months this year is put at 1,000,000 bales above last year. Cotton coming into sight at present lags by about 25% the amount brought in a year ago; while exports have dropped 400,000 bales behind.

The winter and spring wheat crops in the United States are estimated to be the shortest since 1893, according to the Federal Crops Reporting Board. Oats, barley, rye, and hay are also hit hard, and cotton seems about to join the list.

Week ended June 16. Cotton fluctuated on both sides of the market this week principally in response to weather reports. Speculators bought and sold on weather news, with prices showing losses of from 8 to 11 points for the week.

At the close July was 11.95¢ against 12.06¢ last week; October 12.20 against 12.30; December 12.31 against 12.42; January 12.36 against 12.47; March 12.47 against 12.57; and May 12.58 against 12.66.

High temperatures continue to prevail in Texas and Oklahoma, and rainfall there has been only half of normal in the last 6 weeks. The outlook for over the week-end was uncertain, which led to much evening up, but private advices reflect a feeling that the crop has suffered real damage in the West.

Rainfall was steady in the East until the last of the week, when it eased up, but on Friday a tropical storm from the Gulf of Mexico was headed north. The Mississippi Plant Board reveals that weevil infestation in that state averaged 119 weevils to the acre, against 76 the previous week, and 32 a year ago.

The suspension of debt payments by Germany dampened buying enthusiasm in this market. It was pointed out that next to Japan, Germany is the heaviest buyer of American cotton. So far this season Japan has taken 1,721,000 bales, Germany 1,347,000, and Great Britain 1,212,000. The restriction on gold exports will probably reduce purchases by Germany to an insignificant figure, with mills working on accumulated stocks.

Forwardings to domestic mills were 49,000 bales last week, against 51,000 the previous week and 167,000 a year ago. World figures were 74,000 bales behind last year's, against an excess of 577,000 early in April. Buying was much better, at higher prices. Offers were made for late deliveries at current prices, but mills refused the offers. The index of forwardings by *The New York Times* gives a vivid comparison of this year with last. For the June 9 week the index is at 82.6, against 86.2 in the previous week and 222.7 in the same 1933 week.

The Census Bureau figures for May

cotton consumption show takings of 519,765 bales of lint, compared with 512,703 in April and 620,561 in May, 1933. Cotton on hand May 31 in consuming establishments and public storage and compresses was 7,992,092 bales of lint, against 8,715,355 last year. Exports for May were 284,764 bales of lint, against 386,594 in April and 591,648 in May, 1934. For the first 10 months exports were 6,769,369 bales, against 7,112,831 in the same period a year ago.

Week ended June 23. With the approach of July notice-day the long interest was largely liquidated in the market during the week, and the contracts bought under the stimulus of monetary operations during 1933 are almost entirely sold. Weather conditions in the East improved, but the drought continues in Texas, with 25 stations reporting temperatures of 100° to 110° for 24 hours. Private estimates appearing Monday are expected to show that the crop lost ground during June, when normally it should gain.

The only spurt in prices was occasioned by the plan for buying cotton by the government for relief purposes. Senator Smith, of South Carolina, in answer to a telegram said that money was on hand for the purpose, but no details had been worked out.

For the week prices were 2 points up and one point down. July closed at 11.94¢ against 11.95¢; October 12.22 against 12.20; December 12.33 against 12.31; January 12.38 against 12.36; March 12.49 against 12.47; and May 12.59 against 12.58.

Forwardings last week were 62,000 bales, against 49,000 in the preceding week and 175,000 in the same week a year ago. Mills have much cotton on hand, with some putting the stock at the highest since 1927. The control committee in Germany for the limitation of imports and exports will undoubtedly affect our cotton figures, which now show a drop of half a million bales of cotton in our exports this year, compared with last. Trading in the dry goods market was brisk, but mills, expecting higher prices, are reluctant sellers. Forwardings to mills of the world so far this season are 12,547,000 bales, against 12,780,000 bales last year. The movement into sight has been 11,815,000 bales, against 13,241,000 last season and 14,523,000 in 1932.

Cotton spinning activity was 98.2% of capacity in May, against 104.5 in April, and 112.3 in May, 1933. Average spindle hours for May were 235, compared with 234 in April and 268 for May, 1933.

The first bale of the new cotton crop was received in Houston, 4 days later than last year.

On June 25 lack of relief from the drought in Texas increased buying as July liquidation diminished. The cotton list closed at the top with a gain of 17 to 18 points, uninfluenced by the course of either grains or stocks. Closing prices follow: July 12.13¢, October 12.42, December 12.51, January 12.56, March 12.68, and May 12.76.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
June 2	11.70
June 9	12.11
June 16	12.20
June 23	12.19

New York Quotations

June 25, 1934

	Cents
Drills	
38-inch 2.00-yard ..... yd.	$0.15⅜
40-inch 3.47-yard	.08½
50-inch 1.52-yard	.21¾
52-inch 1.85-yard	.17½
Ducks	
38-inch 2.00-yard D. F..... yd.	.15½
40-inch 1.45-yard S. F.....	.22
72-inch 1.05-yard D. F.....	.30½
72-inch 17.21-ounce	.34¾
MECHANICAL	
Hose and belting..... lb.	.34½
TENNIS	
52-inch 1.35-yard ..... yd.	.23½
***Hollands**	
GOLD SEAL	
30-inch No. 72..... yd.	.19½
40-inch No. 72	.21½
RED SEAL	
30-inch ..... yd.	.17
40-inch	.18½
50-inch	.24½
Osnaburgs	
40-inch 2.34-yard ..... yd.	.13¼
40-inch 3.00-yard	.10⅜
40-inch 10-ounce part waste.....	.15¼
37-inch 2.42-yard	.12⅜
Raincoat Fabrics	
COTTON	
Bombazine 60 x 64..... yd.	.09¾
Plaids 60 x 48.....	.11⅝
Surface prints 60 x 64.....	.12½
Print cloth, 38½-inch, 60 x 64.....	.06½
SHEETINGS, 40-INCH	
48 x 48, 2.50-yard..... yd.	.10⅝
64 x 68, 3.15-yard.....	.10¼
56 x 60, 3.60-yard.....	.08¾
44 x 48, 3.75-yard.....	.06½
SHEETINGS, 36-INCH	
48 x 48, 5.00-yard..... yd.	.06
44 x 40, 6.15-yard.....	.05⅛
Tire Fabrics	
BUILDER	
17¼ ounce 60" 23/11 ply Karded peeler ..... lb.	.42¾
CHAFER	
14 ounce 60" 20/8 ply Karded peeler ..... lb.	.42¾
9¾ ounce 60" 10/2 ply Karded peeler ..... lb.	.36
CORD FABRICS	
23/5/3 Karded peeler, 1 1/16" cotton.. lb.	.42¾
15/3/3 Karded peeler, 1 1/16" cotton.. lb.	.40¾
23/5/3 Karded peeler, 1¼" cotton.. lb.	.51¾
23/5/3 Combed Egyptian..... lb.	.58¾
LENO BREAKER	
8¾ ounce and 10¼ ounce 60" Karded peeler ..... lb.	.35

*Prices for 1,200 yards of a width or over.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. A fair demand continues for near-month shipments. Fabric prices are holding quite well, when one considers the trading pace. The advancing raw cotton market assists materially in keeping fabric prices reasonably firm. Cotton fabric manufacturers should be able to look forward to accelerated demand for their product beginning not later than early August.

RAINCOAT FABRICS. The fall season for raincoats has started, and all manufacturers report very good business increase. From now on for a period of 3 months they expect to be doing a very large volume of business.

SHEETINGS. The market is undergoing the usual period of summer seasonal quiet. Prices are fair, but goods are selling below replacement cost.

TIRE FABRICS. The demand for tire fabrics is moderate and seasonal. Prices are nominal, steady, and unchanged.

RUBBER SCRAP

IN MAY and June the market was dull for all grades of rubber scrap. The demand that existed, however, was steady. The export business for inner tubes and solid tires is very good and steady.

BOOTS AND SHOES. The footwear trade is rather quiet, and prices remain the same.

INNER TUBES. All grades are active. The demand is very good, with prices firm and unchanged.

TIRES. The activity of a month ago subsided into a state of comparative quiet. Mixed auto tires with beads have declined $1.25 per ton, and black auto peelings $1.00 to $1.50 per ton since a month ago.

SOLID TIRES. The export demand for solid tires is good. The price of clean mixed grade advanced $1.00 per ton.

MECHANICALS. All grades of mechanical goods scrap are quiet, at quotations the same as last month.

CONSUMERS' BUYING PRICES
(Carload Lots Delivered Eastern Mills)
June 25, 1934

		Prices	
Boots and Shoes			
Boots and shoes, black.... lb.		$0.01¾/	$0.01½
Colored ..... lb.		.01⅛/	.01¼
Untrimmed arctics ..... lb.		.01⅛/	.01¼
Inner Tubes			
No. 1, floating ..... lb.		.06¾/	.07
No. 2, compound..... lb.		.03¾/	.04
Red ..... lb.		.02¾/	.02⅞
Mixed tubes ..... lb.		.03¼/	.03⅜
Tires (Akron District)			
Pneumatic Standard			
Mixed auto tires with beads ..... ton	10.25	/10.50	
Beadless ..... ton	16.50	/17.00	
Auto tire carcass..... ton	11.00	/12.00	
Black auto peelings..... ton	20.50	/21.00	
Solid			
Clean mixed truck..... ton	40.00	/41.00	
Light gravity ..... ton	40.00	/42.00	
Mechanicals			
Mixed black scrap..... lb.	.01	/ .01⅛	
Hose, air brake ..... ton	15.00	/16.00	
Garden, rubber covered. ton	13.00	/13.50	
Steam and water, soft.. ton	13.00	/13.50	
No. 1 red..... lb.	.01⅞/	.02	
No. 2 red ..... lb.	.01⅛/	.01¼	
White druggists' sundries.. lb.	.02	/ .02⅛	
Mechanical ..... lb.	.01¼/	.01½	
Hard Rubber			
No. 1 hard rubber..... lb.	.10¼/	.10⅝	

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934		
Jan.	2,521,961	$239,054
Feb.	1,983,210	193,732
Mar.	2,539,425	257,545
Apr.	2,988,131	321,390

Data from United States Department of Commerce, Washington, D. C.

This Manufacturer of

PROOFING MATERIAL

was receiving complaints from his customers on the "rubber smell" in raincoats and shower curtains. But complaints ceased and sales increased when he corrected this odor with a

PARA-DOR

Para-Dors are aromatic chemicals for counteracting odor in rubber compounds. There are 15 Para-Dors—some which neutralize odor, others which impart a definite scent—for different type rubber.

May we discuss the Para-Dor designed for your product?

GIVAUDAN
DELAWANNA INC.
Industrial Aromatics Division
80 FIFTH AVENUE NEW YORK, N. Y.

Regular and Special Constructions
of
COTTON FABRICS

Single Filling Double Filling
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

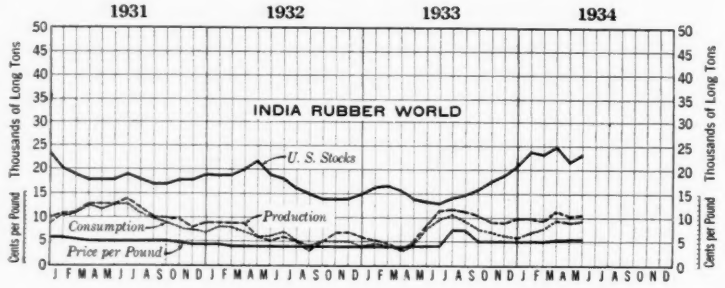
RECLAIMED RUBBER

RECLAIMING plants are being operated on a fairly active basis in expectation of higher prices. The reclaimers' code has not as yet effected any change in the ratio of the use of reclaim to crude. The uncertain outcome of the industrial labor situation and the seasonal quiet of summer are responsible for a distinct hesitancy in placing future commitments although the trade is signing some contracts.

New York Quotations

June 25, 1934

	Spec. Grav.	Cents per Lb.
High Tensile		
Super-reclaim, black	1.20	8¾/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6½
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5½/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½


1931
1932
1933
1934
INDIA RUBBER WORLD
U. S. Stocks
Production
Consumption
Price per Pound
Thousands of Long Tons
Cents per Pound
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1930	157,967	153,497	41.5	24,008	9,468
1931	132,462	125,001	35.7	19,257	6,971
1932	75,656	77,500	23.3	21,714	3,536
1933	99,974	81,612	20.1	20,746	3,583
1934					
January	9,828	7,000	17.3	24,303	333
February	9,504	7,646	18.8	23,356	282
March	11,479	9,683	20.3	25,113	354
April	10,185	9,387	20.9	22,033	394
May	10,848	9,500	22.1	22,887	559

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

IMPORTS, CONSUMPTION, AND STOCKS

CONSUMPTION of crude rubber by United States manufacturers for May totaled 43,012 long tons, against 44,947 long tons for April, and 44,074 (revised) for May, 1933, a decrease of 4.3% and 2.4%, respectively, according to R.M.A. statistics.

Crude rubber imports for May were 47,954 long tons, an increase of 5.0% over April and 74.0% above May, 1933.

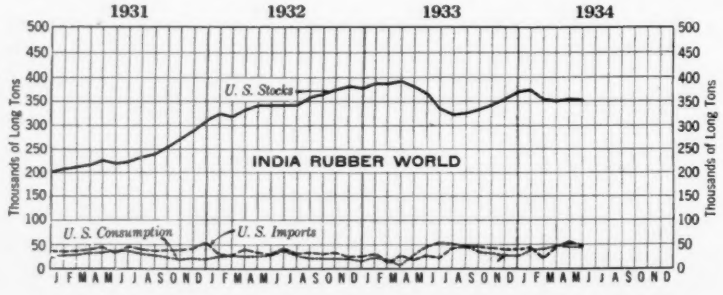
The estimated total domestic stocks of crude rubber May 31 were 351,329 long tons, compared with April 30 stocks of 351,981 long tons. May stocks show little change as compared with April, but were 8.1% below stocks of May 31, 1933.

Crude rubber afloat for the United States ports on May 31 was 57,921 long tons against 56,251 long tons afloat April 30 and 43,342 long tons May 31, 1933.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang, Etc., Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1930	488,343	375,980	200,998	56,035	118,297	45,179	821,815	684,993	360,034
1931	495,163	348,986	322,825	40,455	127,103	55,458	797,441	668,660	495,724
1932	400,787	332,000	379,000	38,360	92,567	36,802	709,840	670,250	518,187
1933	411,615	405,687	364,541	55,606	86,438	48,744	845,291	818,370	489,029
1934									
January	46,204	40,413	368,660	45,768	90,272	51,427	81,487	77,200	510,359
February	31,032	40,609	357,094	53,063	92,482	52,580	88,239	82,100	502,155
March	44,605	47,097	353,242	54,722	94,314	59,224	92,070	78,000	504,601
April	45,662	44,947	351,981	56,251	96,108	63,381	84,153	88,400	508,795
May	47,954	43,012	351,329	57,921	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule. †Stocks on hand the last of the month or year. ‡W. H. Rickinson & Son's figures. §Stocks at the 3 main centers, U. S. A., U. K., Singapore and Penang.


1931
1932
1933
1934
INDIA RUBBER WORLD
U. S. Stocks
U. S. Consumption
U. S. Imports
Thousands of Long Tons
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

United States Stocks, Imports and Consumption

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
June 2	42,503	54,103
June 9	43,308	54,295
June 16	43,709	54,327
June 23	44,157	54,228

New Softball

THE "Duro-Seam" indoor-outdoor ball has several features, one of which is the vulcanizing of latex to the inside of the cover, which makes the ball more uniform and pliable and permits greater adherence to the center. The other feature is a "Duro-Bilt" center. In making this center the yarn is cemented with pure gum rubber, as it is wound, rather than dipped, into a cement solution afterward. J. H. Grady Mfg. Co., 927 Tyler St., St. Louis, Mo

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(Advertisements continued on page 77)

Rubber Questionnaire

First Quarter, 1934*

Reclaimed Rubber	Long Tons — Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (5)	4,480	10,996	9,226	.....
Manufacturers who also reclaim (30)	6,872	17,868	7,592	9,940
Other manufacturers (100)	7,225	.....	.....	12,414
Totals	18,577	28,864	16,818	22,354

Scrap Rubber	Long Tons — Inventory	Consumption	Due on Contract
Reclaimers solely (5)	30,133	13,332	8,984
Manufacturers who also reclaim (22)	54,298	19,720	14,522
Other manufacturers (22)	258	.....	.....
Totals	84,689	33,052	23,506

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

Products — Tires and Tire Sundries	Crude Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
All types pneumatic casings (except bicycle, airplane)	76,989	$68,191,000
All types pneumatic tubes (except bicycle, airplane)	11,990	10,010,000
Bicycle tires (single tubes, casings, and tubes)	428	574,000
Airplane tires and tubes	26	80,000
Solid and cushion tires for highway transportation	390	531,000
All other solid and cushion tires	79	275,000
Tire sundries and repair materials	1,405	2,860,000
Totals	91,307	$82,521,000
Other Rubber Products		
Mechanical rubber goods	8,643	$21,679,000
Boots and shoes	4,963	12,547,000
Insulated wire and insulating compounds	735	†2,811,000
Druggists' sundries, medical and surgical rubber goods	892	1,700,000
Stationers' rubber goods	379	421,000
Bathing apparel	168	334,000
Rubber clothing	116	341,000
Automobile fabrics	216	875,000
Other rubberized fabrics	882	2,346,000
Hard rubber goods	323	1,615,000
Heels and soles	3,670	5,735,000
Rubber flooring	187	369,000
Sponge rubber	319	516,000
Sporting goods, toys, and novelties	420	1,186,000
Miscellaneous, not included in any of the above items	1,963	5,431,000
Totals	23,876	$57,906,000
Grand totals—all products	115,183	$140,427,000

Inventory of Rubber in the United States and Afloat

	Long Tons — Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	213,198	20,289
Importers and dealers	57,521	35,161
Totals	270,719	55,450

*Number of rubber manufacturers that reported data was 237; crude rubber importers and dealers, 42; reclaimers (solely), 5; total daily average number of employes on basis of third week of Jan., 1934, was 145,764.

It is estimated that the reported grand total crude rubber consumption is 91%; grand total sales value, 95%; the grand total crude rubber inventory, 76.7%; afloat figures unavailable; the reclaimed rubber production, 100%; reclaimed consumption, 86%; and reclaimed inventory, 86.6% of the total of the entire industry.

†Several companies did not report sales value on this item, but did report crude rubber consumption, stocks, etc. Their figures for the first quarter, 1934, have been estimated.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*7,400	Hose	Tenerife, Canary Islands
†7,426	Erasers	Mexico City, Mexico
*7,475	Crude rubber and rubber substitute for manufacturing surgical goods	Zeulenroda, Germany
*7,476	Heel taps for use with removable inner soles	Isere, France
*7,499	Latex	Montreal, Canada
*7,500	Lastex ribbed corset cloth	Prague, Czechoslovakia

*Purchase. †Purchase and agency.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	Twelve Months Ended December, 1932 — Pounds	Value	Twelve Months Ended December, 1933 — Pounds	Value
Unmanufactured				
Crude rubber, etc.	8,380,352	$342,895	43,281,821	$2,739,305
Rubber and gutta percha	38,473,478	1,793,494	.....	.....
Gutta percha	.....	.....	6,858	6,421
Rubber, recovered	6,027,400	256,795	5,182,200	201,828
Rubber, powdered, and gutta percha scrap	1,846,900	30,181	2,349,900	38,418
Balata	18,177	5,273	11,448	5,470
Rubber substitute	233,500	33,428	201,200	41,245
Totals	54,979,807	$2,462,066	51,033,427	$3,032,687
Partly Manufactured				
Hard rubber sheets and rods	13,607	$9,752	68,312	$15,726
Hard rubber tubes	.....	6,434	.....	5,843
Rubber thread not covered	161,415	125,730	118,488	99,767
Totals	175,022	$141,916	186,800	$121,336
Manufactured				
Belting	.....	$48,798	.....	$43,425
Hose	.....	45,518	.....	46,297
Packing	.....	38,609	.....	40,711
Boots and shoes.....*pairs*	128,453	52,719	674,143	225,681
Clothing, including waterproofed	.....	11,517	.....	10,620
Raincoats .....*number*	14,056	44,505	12,046	36,136
Gloves .....*dozen pairs*	.....	8,090	.....	7,124
Hot water bottles	.....	23,076	.....	17,660
Tires, bicycle .....*number*	38,105	19,946	23,899	11,416
Pneumatic .....*number*	12,126	99,705	16,454	132,830
Inner tubes .....*number*	898	3,281	1,860	4,653
Solid for automobiles and motor trucks....*number*	476	24,917	260	8,264
Other solid tires	.....	14,990	.....	8,256
Mats and matting	.....	38,603	.....	39,119
Cement	.....	51,894	.....	66,128
Golf balls .....*dozen*	34,770	103,367	32,820	93,265
Heels .....*pairs*	94,884	7,222	93,786	3,659
Other rubber manufactures	.....	707,919	.....	600,445
Totals	.....	$1,344,676	.....	$1,395,689
Totals, rubber imports	.....	$3,948,658	.....	$4,549,712

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured				
Waste rubber	$27,116	.....	$40,278	.....
Manufactured				
Belting	$193,392	.....	$229,892	.....
Canvas shoes with rubber soles	628,191	.....	736,755	.....
Boots and shoes	1,607,058	.....	2,043,490	.....
Clothing, including waterproofed	53,150	.....	72,312	.....
Heels	167,202	.....	174,627	.....
Hose	70,586	.....	72,899	.....
Soles	107,790	.....	204,583	.....
Tires, b.cycle	137	.....	94	.....
Pneumatic	3,044,889	.....	3,336,069	.....
Inner tubes	202,535	.....	245,436	.....
Solid	1,975	.....	.....	.....
Other rubber manufactures	568,027	$134,960	488,001	$15,935
Totals	$6,644,932	$134,960	$7,604,158	$15,935
Totals, rubber exports	$6,672,048	$134,960	$7,644,436	$15,935

World Rubber Absorption—Net Imports

Consumption	Long Tons—1934 — Jan.	Feb.	Mar.	Apr.
United States	39,504	41,065	48,684	45,957
United Kingdom	5,688	8,586	12,191	8,202
Net Imports				
Australia	566	950	671	415
Austria	304	*300	...	...
Belgium	2,173	1,538	965	...
Canada	1,721	1,854	3,411	2,419
Czechoslovakia	1,355	516	976	...
Denmark	114	108	112	117
Finland	221	24	92	227
France	6,843	7,373	7,871	8,192
Germany	6,057	5,490	6,453	6,701
Italy	2,517	2,388	1,394	...
Japan	5,628	4,570	5,655	...
Netherlands	381	287	284	...
Norway	136	75	106	83
Russia	2,749	3,399	...	...
Spain	484	656	...	...
Sweden	714	257	526	...
Switzerland	156	59	156	...
Others	*2,250	*2,250	*2,250	...
Totals	79,561	81,745	...	...
Minus United States (Cons.)	39,504	41,065	48,684	45,957
Total foreign	40,057	40,680	...	...

*Estimate. *Compiled by Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C.*

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Carbon Black
Clay

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Classified Advertisements

Continued

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(SOLID OR GRANULATED)
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Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.
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BROCKTON TOOL COMPANY
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Pontianac
Gutta Percha
LITTLEJOHN & CO., Inc.
IMPORTERS
133 FRONT STREET NEW YORK

BAIRD
RUBBER & TRADING CO., Inc.
CRUDE RUBBER
AND
LIQUID LATEX
233 Broadway *New York*

(*Advertisements continued on page 79*)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	March, 1934		Three Months Ended March, 1934	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	92,106,613	$6,765,173	276,452,456	$19,431,007
Liquid latex	2,539,425	257,545	7,044,596	690,331
Jelutong or pontianak	561,198	43,532	3,291,786	315,969
Balata	324,644	51,080	697,777	131,358
Gutta percha	231,394	32,668	723,195	72,800
Guayule	112,000	9,464	112,000	9,464
Scrap and reclaimed, etc.	992,188	10,924	2,129,393	17,393
Totals	96,867,462	$7,170,386	290,451,203	$20,668,322
Chicle, crude—*Free*	1,288,394	$308,856	2,259,185	$519,309
MANUFACTURED—*Dutiable*				
Rubber soled footwear with fabric uppers—*pairs*	115,991	$38,695	456,924	$140,122
Rubber toys	.....	20,774	.....	68,258
Druggists' sundries, n. e. s.	.....	6,958	.....	17,353
Combs, hard rubber *number*	172,920	6,434	504,864	22,162
Golf balls—*number*	69,996	16,360	85,644	19,702
Tennis and other rubber balls—*number*	281,668	19,845	468,630	32,189
Tires—*number*	164	1,459	2,144	7,870
Other rubber manufactures	.....	41,459	.....	107,782
Totals	.....	$151,984	.....	$415,438

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	6,601,189	$583,313	15,802,584	$1,411,661
Balata	19,195	7,654	34,213	10,880
Guayule	5,600	473	5,600	473
Rubber manufactures	.....	873	.....	2,390
Totals	.....	$592,313	.....	$1,425,404

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	791,942	$36,101	2,168,343	$99,498
Scrap	4,100,886	79,075	11,541,870	222,240
Rubberized automobile cloth, *sq. yd.*	53,772	30,821	174,216	89,362
Other rubberized piece goods and hospital sheeting, *sq. yd.*	81,816	35,910	171,154	75,883
Footwear				
Boots—*pairs*	4,927	12,068	17,428	44,069
Shoes—*pairs*	20,172	8,406	48,777	27,403
Canvas shoes with rubber soles—*pairs*	28,570	18,300	38,357	26,089
Soles—*doz. pairs*	5,602	6,835	12,410	17,209
Heels—*doz. pairs*	32,431	18,127	87,508	45,991
Water bottles and fountain syringes—*number*	17,798	6,118	46,036	16,780
Gloves—*doz. pairs*	4,398	8,756	11,610	22,936
Other druggists' sundries	.....	32,942	.....	84,500
Balloons—*gross*	22,386	20,800	66,748	61,241
Toys and balls	.....	4,574	.....	9,878
Bathing caps—*doz.*	20,257	36,387	39,769	67,249
Bands	26,288	7,437	64,013	19,688
Erasers	32,236	15,217	72,309	37,188
Hard rubber goods				
Electrical goods	78,884	8,047	284,681	31,516
Other goods	.....	20,734	.....	40,291
Tires				
Truck and bus casings, *number*	29,782	426,877	59,209	918,695
Other automobile casings, *number*	91,423	568,259	213,288	1,459,165
Tubes, auto—*number*	79,802	83,317	181,843	196,478
Other casings and tubes, *number*	4,546	12,716	7,646	20,439
Solid tires for automobiles and motor trucks *number*	684	18,788	1,925	55,062
Other solid tires	109,582	18,070	392,263	52,034
Tire sundries and repair materials	.....	38,910	.....	90,107
Rubber and friction tape	48,403	13,327	140,915	36,176
Belting	225,926	98,298	572,631	251,129
Hose	436,626	123,566	1,041,801	299,362
Packing	92,722	41,573	275,180	115,917
Thread	105,873	67,984	303,065	186,036
Other rubber manufactures	.....	109,816	.....	275,151
Totals	.....	$2,028,156	.....	$4,994,762

Imports by Customs Districts

	April, 1934 *Crude Rubber		April, 1933 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	7,241,873	$688,174	4,522,854	$138,257
New York	77,660,479	6,585,372	36,977,786	1,079,604
Philadelphia	2,897,180	217,247	384,924	10,835
Maryland	3,236,371	248,381	2,234,691	61,434
New Orleans	1,249,180	82,802	.....	.....
Los Angeles	7,511,516	635,975	2,682,227	70,938
San Francisco	627,424	38,080	78,400	3,920
Oregon	33,600	2,944	11,200	448
Ohio	119,218	10,223	.....	.....
Colorado	616,000	44,938	224,000	6,449
Totals	101,192,841	$8,554,136	47,116,082	$1,371,885

*Crude rubber including latex dry rubber content.

Rubber Goods Production Statistics

TIRES AND TUBES	1934	1933
	March	March
Pneumatic casings		
Production—*thousands*	5,024	1,630
Shipments, total—*thousands*	4,096	1,674
Domestic—*thousands*	3,966	1,616
Stocks, end of month—*thousands*	11,301	5,832
Solid and cushion tires		
Production—*thousands*	15	7
Shipments, total—*thousands*	15	7
Domestic—*thousands*	14	6
Stocks, end of month—*thousands*	28	21
Inner tubes		
Production—*thousands*	5,039	1,506
Shipments, total—*thousands*	3,995	1,522
Domestic—*thousands*	3,906	1,486
Stocks, end of month—*thousands*	9,937	5,095
Raw material consumed		
Fabrics—*thous. of lbs.*	20,927	6,364
MISCELLANEOUS PRODUCTS		
Rubber bands, shipments—*thous. of lbs.*	262	162
Rubber clothing, calendered		
Orders, net—*no. of coats and sundries*	19,963	8,058
Production—*no. of coats and sundries*	11,364	20,997
Rubber-proofed fabrics, production, total—*thous. of yds.*	3,575	2,303
Auto fabrics—*thous. of yds.*	434	134
Raincoat fabrics—*thous. of yds.*	1,527	953
Rubber flooring, shipments—*thous. of sq. ft.*	490	307
Rubber and canvas footwear		
Production, total—*thous. of prs.*	....	3,281
Tennis—*thous. of prs.*	....	2,634
Waterproof—*thous. of prs.*	....	647
Shipments, total—*thous. of prs.*	....	3,390
Tennis—*thous. of prs.*	....	2,842
Waterproof—*thous. of prs.*	....	548
Shipments, domestic, total—*thous. of prs.*	....	3,339
Tennis—*thous. of prs.*	....	2,800
Waterproof—*thous. of prs.*	....	539
Stocks, total, end of month—*thous. of prs.*	....	14,965
Tennis—*thous. of prs.*	....	6,730
Waterproof—*thous. of prs.*	....	8,235
Rubber heels		
Production—*thous. of prs.*	19,903	11,222
Shipments, total—*thous. of prs.*	19,294	10,761
Export—*thous. of prs.*	347	170
Repair trade—*thous. of prs.*	6,605	2,677
Shoe manufacturers—*thous. of prs.*	12,199	7,914
Stocks, end of month—*thous. of prs.*	39,592	25,549
Rubber soles		
Production—*thous. of prs.*	5,726	3,959
Shipments, total—*thous. of prs.*	5,770	3,925
Export—*thous. of prs.*	3	235
Repair trade—*thous. of prs.*	532	271
Shoe manufacturers—*thous. of prs.*	5,235	3,419
Stocks, end of month—*thous. of prs.*	4,838	3,302
Mechanical rubber goods, shipments		
Total—*thous. of dollars*	4,510	2,018
Belting—*thous. of dollars*	830	358
Hose—*thous. of dollars*	1,500	802
Other—*thous. of dollars*	2,181	858

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

London Stocks, April, 1934

LONDON	Landed Tons	Delivered Tons	Stocks, April 30 1934 Tons	1933 Tons	1932 Tons
Plantation	6,025	4,106	42,396	40,861	61,794
Other grades	....	7	17	50	54
LIVERPOOL					
Plantation	*2,025	*2,143	*53,695	*54,155	*61,387
Total tons, London and Liverpool	8,050	6,256	96,108	95,066	123,235

*Official returns from the recognized public warehouses.

World Rubber Shipments—Net Exports

	Long Tons—1934			
British Malaya	Jan.	Feb.	Mar.	Apr.
Gross exports	55,055	57,867	58,515	56,748
Imports	21,184	19,688	26,470	27,963
Net	33,871	38,179	32,045	28,785
Ceylon	6,929	8,620	6,750	6,618
India and Burma	1,531	775	1,412	...
Sarawak	1,197	1,005	1,360	1,449
British N. Borneo	*750	*750	*750	*750
Siam	1,290	1,264	1,363	1,311
Java and Madura	6,513	6,706	8,655	7,282
Sumatra E. Coast	8,974	10,277	12,043	11,324
Other N. E. Indies	17,718	17,466	25,064	24,054
French Indo-China	2,158	1,100	1,316	1,519
Amazon Valley	576	831	846	440
Africa	*200	*200	*200	*200
Totals	81,707	87,173	91,804	83,732

*Estimate. *Compiled by Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C.*